

Dr/ hany abdou

The Ultimate Evidence-
Based practical Guide for
Audiology Intern & Fresh
Graduates

The Art of Evidence- Based Best Practices in Audiology Report Writing

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Report Writing

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Dr. Hany Abdou

M.Sc. Audio-Vestibular Medicine

Preface

Dear Reader,

*Welcome to **The Art of Evidence-Based Best Practices in Audiology Report Writing**.*

Picture this:

Little Sara, just 2 years old, didn't respond when her name was called. Her parents were worried. As a fresh audiology intern, you had the test results—but froze when it came time to write the report.

This book was created to solve that struggle.

*If you're an **audiology intern, fresh graduate, or early-career clinician**, this book is for you.*

Many students perform tests perfectly—but when it comes to report writing, they hesitate. They copy numbers from the audiogram, write vague recommendations, or leave ENT specialists and parents confused.

Imagine this scenario:

Two audiologists test the same patient. One writes “mild hearing loss.” Another writes “25–40 dB HL.” A third says “slight to moderate loss.”

Confusing, right?

*Evidence-based reporting gives us **one clear language** everyone understands.*

*This book is written for those who face one of the biggest challenges in audiology training: **writing clear, professional, and clinically useful reports.***

*I will take you step by step—
From the basics of **evidence-based writing**
Through **adult and pediatric reports**
All the way to **advanced and special cases***

The purpose of this book:

*To help you **master the art of writing clear, concise, and evidence-based audiology reports.***

*Report writing is not just paperwork—it's a reflection of your **clinical reasoning**. A well-structured report can:*

*Guide medical decisions
Support rehabilitation plans
Build trust with patients and colleagues*

*Unfortunately, many students find report writing either **too complicated or too dry**. This manual aims to change that.*

*Here, you'll find:
Simple, practical guidance
Evidence-based principles*

Ready-to-use templates

Training-style explanations that are easy to follow and remember

*By the end of this book, my hope is that you will not only write reports—you will **communicate effectively, add value to patient care, and gain confidence as a future audiologist.***

With best wishes for your journey,

Dr. Hany Abdou

M.Sc. Audio-Vestibular Medicine

Acknowledgments

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*And finally, to all the **students and interns**, whose questions, curiosity, and passion for learning pushed me to create something truly useful for the next generation of audiologists—this book is for you.*

*May this guide be more than just a reference—may it be a companion in your clinical practice, helping you master the **art of evidence-based audiology reporting**.*

With gratitude respect and warm regards,

Dr. Hany Abdou

M.Sc. Audio-Vestibular Medicine



About the Author



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*With years of clinical and teaching experience, Dr. Hany Abdou **combines** academic expertise with hands-on practice. His passion is to **simplify** audiology for students and young doctors, bridging the gap between theory and clinical reality.*

How to Use This Book

- *Each chapter covers one audiological test.*
- *You'll get a **short intro**, **key points**, the **report template**, a **sample report**, and quick **tips & pitfalls**.*
- *Don't just read—practice.*
- *By the end, you'll have the confidence to write **professional, evidence-based reports** for every situation.*

Why Report Writing Matters

Audiology is not just about performing tests. It is about helping people.

*And the bridge between **the test** and **the patient's care** is the **report**.*

Think of the audiology report as:

- *A **map** for the ENT doctor.*
- *A **guide** for the speech therapist.*
- *A **message** for the patient and their family.*

If the report is weak, the whole team is lost.

If the report is strong, everyone knows exactly what to do next.

That is why learning to write reports is as important as learning to do the test itself.

In this book, you will learn:

- ***How to turn raw data into clear diagnosis.***
- ***How to write recommendations that are useful and evidence-based.***
- ***How to adapt your report to your audience: ENT, parent, or colleague.***

***Key idea:** A strong report = strong patient care.*

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Ear anatomy

- Introduces the *structure and function of the ear*.
- Essential for understanding hearing loss, middle ear disorders, and balance problems.
- **Outer Ear:** Pinna, External Auditory Canal, Tympanic Membrane (eardrum).
- **Middle Ear:** Ossicles (Malleus, Incus, Stapes), Eustachian Tube, Middle Ear Cavity.
- **Inner Ear:** Cochlea, Vestibule, Semicircular Canals, Auditory & Vestibular Nerves.
- **Function:** Outer ear collects sound, middle ear amplifies vibrations, inner ear converts to neural signals.

Common Ear Pathology

- Covers *frequent ear disorders* affecting outer, middle, and inner ear.
- Helps clinicians *identify, differentiate, and manage hearing and balance issues*.

Key Points

Outer Ear Disorders:

- **Otitis externa (swimmer's ear):** Infection of the ear canal; symptoms: pain, itching, discharge.
- **Impacted cerumen (earwax):** Can cause temporary hearing loss, discomfort, or tinnitus.
- **Trauma / foreign body:** Laceration, hematoma, or object in canal; requires prompt assessment.

Middle Ear Disorders:

- **Otitis media (acute / chronic):** Infection or fluid in middle ear; common in children.
- **Tympanic membrane perforation:** Hole in eardrum due to infection, trauma, or pressure changes.
- **Otosclerosis:** Abnormal bone growth around stapes; causes conductive hearing loss.

Inner Ear Disorders:

- **Sensorineural hearing loss:** Due to noise exposure, aging, genetics, or ototoxic medications.
- **Meniere's disease:** Episodic vertigo, fluctuating hearing loss, tinnitus, and aural fullness.

- ***Vestibular neuritis / labyrinthitis:*** Inflammation causing sudden vertigo, imbalance, nausea.

Tips & Pitfalls

Differentiate ***conductive vs. sensorineural hearing loss*** using audiometry + tympanometry.

Document ***ear canal condition*** before inserting hearing aids or probes.

Recognize ***red flags***: severe pain, vertigo, sudden hearing loss, or drainage.

- Knowing common ear pathologies allows ***early detection and better management***.
- Outer and middle ear disorders are often ***treatable***, inner ear pathologies may require ***long-term management***.
- Combine ***history, otoscopic exam, and audiology tests*** for accurate diagnosis.

Always check ***tympanic membrane integrity*** before inserting ear probes or hearing aids.

Document ***ear canal shape or obstructions*** that may affect audiometry or OAE testing.

Differentiate ***conductive vs. sensorineural pathology*** using audiometry + tympanometry.

Take-Home Points

- Ear anatomy knowledge is ***crucial for accurate diagnosis***.
- Early recognition of common pathologies improves ***hearing outcomes***.

- Always combine *history, exam, and audiological tests* for a complete picture

Common Hearing Disorders

1. Meniere's Disease

- Inner ear disorder with episodic vertigo, fluctuating low-frequency hearing loss, tinnitus, and aural fullness.
- **Key Point** : Usually unilateral; cause: endolymphatic hydrops.
- **Tip** : Early audiometry may show low-frequency loss; manage with salt restriction, diuretics, vestibular rehab.

2. Otosclerosis

- Abnormal bone growth in the middle ear, often around the stapes.
- **Key Point** : Leads to *conductive hearing loss*, may become mixed.
- **Tip** : Confirm with audiometry (Carhart notch at 2 kHz) and CT if needed; surgical (stapedotomy) or hearing aid management.

3. Presbycusis (Age-related Hearing Loss)

- Gradual *sensorineural loss* affecting high frequencies with age.
- **Key Point** : Bilateral, progressive; affects speech comprehension in noise.
- **Tip** : Early hearing aid fitting improves quality of life.

4. Noise-Induced Hearing Loss (NIHL)

- Damage to cochlear hair cells due to prolonged loud noise.
- **Key Point** : High-frequency notch at 4 kHz common in audiogram.
- **Tip** : Preventable with hearing protection; hearing aids can help after damage occurs.

5. Sudden Sensorineural Hearing Loss (SSNHL)

- Rapid-onset sensorineural loss (usually >30 dB across 3 frequencies in <72 hrs).

- **Key Point :** Often idiopathic; can be unilateral.
- **Tip : Medical emergency** – early steroids can improve recovery chances.

6. Vestibular Schwannoma (Acoustic Neuroma)

- Benign tumor of the vestibulocochlear nerve.
- **Key Point :** Causes unilateral sensorineural hearing loss, tinnitus, and imbalance.
- **Tip :** MRI is required for diagnosis; treatment: observation, surgery, or radiosurgery.

Take-Home Points

- Hearing disorders can be **conductive, sensorineural, or mixed**.
- **Early detection** improves treatment outcomes.
- Combine **history, audiology tests, and imaging** for accurate diagnosis.

Common Pediatric Hearing Disorders

1. Otitis Media with Effusion (OME)

- Fluid in the middle ear without infection.
- **Key Point :** Causes mild-moderate conductive hearing loss; may affect speech/language development.
- **Tip :** Monitor, treat recurrent infections, consider tympanostomy tubes if persistent.

2. Acute Otitis Media (AOM)

- Middle ear infection with rapid onset of pain, fever, possible hearing loss.
- **Key Point :** Common in children <5 yrs.

- **Tip :** Antibiotics if bacterial, analgesics for pain; prevent recurrence with vaccines.

3. Congenital Hearing Loss

- Present at birth; can be genetic or due to perinatal factors.
- **Key Point :** Sensorineural hearing loss is most common.
- **Tip :** Early screening (UNHS) and intervention (hearing aids/CI) crucial for speech development.

4. Auditory Neuropathy Spectrum Disorder (ANSD)

- Disorder of neural transmission despite normal outer hair cell function.
- **Key Point :** Present with fluctuating hearing; poor speech perception.
- **Tip :** Diagnosis with ABR + OAE; may benefit from hearing aids or cochlear implants.

5. Chronic Suppurative Otitis Media (CSOM)

- Long-standing middle ear infection with perforation.
- **Key Point :** Persistent conductive hearing loss; risk of cholesteatoma.
- **Tip :** ENT management, regular cleaning, possible surgery.

6. Genetic Syndromes with Hearing Loss

- **Examples:** Waardenburg, Pendred, Usher.
- **Key Point :** Can be syndromic (associated features like vision problems) or non-syndromic.
- **Tip :** Genetic counseling recommended; early audiologic management improves outcomes.

7. Noise-Induced Hearing Loss (NIHL) in Children

- *Damage from loud toys, music, or environmental noise.*
- **Key Point :** *Often high-frequency loss; preventable.*
- **Tip :** *Use hearing protection; education for parents and children.*

8. Auditory Processing Disorder (APD)

- *Difficulty processing auditory information despite normal hearing thresholds.*
- **Key Point :** *Affects listening in noise, following instructions.*
- **Tip :** *Therapy includes auditory training, classroom accommodations, FM systems.*

9. Temporary Threshold Shift (TTS)

- *Short-term hearing loss after loud noise exposure.*
- **Key Point :** *Reversible if noise avoided; repeated exposure may cause permanent loss.*
- **Tip :** *Educate parents and children about safe listening levels.*

10. Congenital Ear Malformations

- *Microtia, atresia, or canal anomalies.*
- **Key Point :** *Often associated with conductive hearing loss.*
- **Tip :** *Early audiologic assessment and hearing aids or bone conduction devices as needed.*

Take-Home Points

- *Early **screening and intervention** are critical.*
- *Combine **history, audiologic testing, and imaging** for accurate diagnosis.*
- *Parental education and protection from noise are essential for long-term hearing health.*

Genetic Syndromes Associated with Hearing Loss

1. Waardenburg Syndrome

- Genetic disorder affecting pigmentation and hearing.
- **Key Points :**
 - Sensorineural hearing loss (often congenital, can be unilateral or bilateral)
 - Distinctive facial features (dystopia canthorum, white forelock)
- **Tip :** Early genetic counseling and audiology intervention; consider hearing aids or cochlear implants depending on severity.

2. Pendred Syndrome

- Autosomal recessive disorder affecting thyroid and inner ear.
- **Key Points :**
 - Progressive sensorineural hearing loss
 - May present with goiter
 - Often associated with enlarged vestibular aqueduct (EVA)
- **Tip :** Monitor hearing closely; avoid head trauma; cochlear implants may be indicated in severe cases.

3. Usher Syndrome

- Genetic disorder causing combined hearing and vision loss.
- **Key Points :**
 - Congenital sensorineural hearing loss
 - Progressive vision loss due to retinitis pigmentosa
 - Balance issues in some types

- **Tip :** Early hearing aids or cochlear implant; low-vision support; multidisciplinary follow-up.

4. Jervell & Lange-Nielsen Syndrome

- Rare autosomal recessive disorder with heart and hearing involvement.
- **Key Points :**
 - Congenital profound sensorineural hearing loss
 - Long QT interval → risk of arrhythmias
- **Tip :** Cardiology and audiology follow-up; cochlear implants for hearing; monitor cardiac status closely.

5. Other Syndromic Hearing Loss Examples

- **CHARGE, Stickler, Branchio-oto-renal (BOR) syndromes**
- **Key Points :**
 - Hearing loss may be conductive, sensorineural, or mixed
 - Often associated with craniofacial anomalies or other organ involvement
- **Tip :** Multidisciplinary assessment; early audiologic intervention essential.

Take-Home Points

- Genetic syndromes may present with **syndromic features + hearing loss**.
- Early diagnosis and intervention **improves communication and quality of life**.
- **Genetic counseling** recommended for families.

Common Audiology Abbreviations & Ear Disorders

1. Common Audiology Abbreviations

<i>Abbreviation</i>	<i>Meaning</i>	<i>Note / Tip</i>
HL	Hearing Loss	General term, can be sensorineural, conductive, or mixed
SNHL	Sensorineural Hearing Loss	Inner ear or auditory nerve origin
CHL	Conductive Hearing Loss	Outer/middle ear problem
MHL	Mixed Hearing Loss	Combination of SNHL & CHL
ABR	Auditory Brainstem Response	Objective test for threshold & neural integrity
ASSR	Auditory Steady-State Response	Frequency-specific objective threshold test
OAE	Otoacoustic Emissions	Cochlear outer hair cell function test
VRA	Visual Reinforcement Audiometry	Behavioral test for young children
CPA	Conditioned Play Audiometry	Behavioral test for toddlers/preschool
REM	Real Ear Measurement	Verification of hearing aid fitting
REIG	Real Ear Insertion Gain	Difference between aided & unaided response
REAR	Real Ear Aided Response	Hearing aid output in real ear
REUR	Real Ear Unaided Response	Baseline ear canal response
HA	Hearing Aid	Device to amplify sound
CI	Cochlear Implant	Electrical stimulation of cochlea for profound HL
MEI	Middle Ear Implant	Implantable device for conductive/mixed HL

2. Common Ear Disorders / Pathologies

<i>Disorder</i>	<i>Type</i>	<i>Key Features / Tip</i>
<i>Otitis Media (OM)</i>	<i>Middle ear</i>	<i>Fluid, inflammation, conductive HL</i>
<i>Otosclerosis</i>	<i>Middle ear</i>	<i>Stapes fixation → CHL; may progress to SNHL</i>
<i>Meniere's Disease</i>	<i>Inner ear</i>	<i>Vertigo, tinnitus, fluctuating SNHL, aural fullness</i>
<i>Acoustic Neuroma / Vestibular Schwannoma</i>	<i>Inner ear / Nerve</i>	<i>Unilateral SNHL, tinnitus, balance issues</i>
<i>Presbycusis</i>	<i>Inner ear</i>	<i>Age-related SNHL, high-frequency loss</i>
<i>Noise-Induced HL (NIHL)</i>	<i>Inner ear</i>	<i>Bilateral high-frequency notch, preventable</i>
<i>Congenital HL</i>	<i>Inner ear</i>	<i>Present at birth, may be syndromic or non-syndromic</i>
<i>Cholesteatoma</i>	<i>Middle ear</i>	<i>Keratin mass, recurrent infections, possible CHL</i>
<i>Tympanic Membrane Perforation</i>	<i>Middle ear</i>	<i>Conductive HL, recurrent OM</i>
<i>Labyrinthitis / Vestibular Neuritis</i>	<i>Inner ear</i>	<i>Vertigo, imbalance, SNHL may occur</i>

Tips:

- Always specify **type & degree of HL** in reports (mild, moderate, severe, profound).
- Use **abbreviations carefully**—explain at first mention in reports.
- Syndromes often have **ear + systemic features**, check genetics & multidisciplinary care.

Audiology Mini Dictionary

A

- ***Acoustic Neuroma / Vestibular Schwannoma*** – Benign tumor on vestibulocochlear nerve causing hearing loss and imbalance.
- ***Acoustic Reflex*** – Involuntary contraction of stapedius muscle in response to loud sound.
- ***Air-Bone Gap*** – Difference between air and bone conduction thresholds; indicates conductive component.
- ***Analog Hearing Aid*** – Older HA amplifying all sounds uniformly.
- ***Anxiety/Depression*** – Emotional impact assessed in vestibular or hearing patients.

B

- ***Binaural Hearing Aid Fitting*** – Using HAs in both ears to improve speech in noise, localization, and prevent sensory deprivation.
- ***Bone-Anchored Hearing Aid (BAHA)*** – Device transmitting sound via bone conduction to cochlea.
- ***Bone Conduction Threshold*** – Hearing sensitivity measured via skull vibration.
- ***Bone Conduction Hearing Aid*** – HA transmitting sound through bone instead of ear canal.
- ***Brainstem Evoked Response Audiometry (ABR)*** – Measures auditory nerve and brainstem response to clicks or tones.

C

- ***Caloric Test*** – Vestibular test stimulating semicircular canals with warm/cool water or air.

- **CIC (Completely-in-Canal) Hearing Aid** – Tiny HA fully hidden in canal.
- **Central Vestibular Findings** – Abnormalities detected in brain or central pathways.
- **Cochlear Implant (CI)** – Electronic device bypassing damaged cochlea to stimulate auditory nerve.
- **Conductive Hearing Loss** – Hearing loss due to middle/external ear problems.
- **Cross-Hearing / Shadow Curve** – Sound presented to one ear heard by the opposite ear.

D

- **Directional Microphone** – Enhances sound from front, reduces background noise.
- **Dynamic Range** – Difference between softest and loudest sounds a person can hear comfortably.

E

- **EEG (Electroencephalography)** – Measures brain electrical activity; sometimes used in auditory research.
- **Eustachian Tube Dysfunction** – Poor middle ear ventilation causing pressure or fluid.
- **Electrocochleography (ECochG)** – Measures cochlear and auditory nerve electrical potentials.
- **Ear Canal Volume (ECV)** – Measurement of external ear canal space; used in tympanometry.
- **Endolymphatic Hydrops** – Excess fluid in inner ear, often seen in Meniere's disease.

F

- **Frequency Response** – How a hearing aid amplifies different frequencies.
- **Frequency Lowering** – HA feature shifting high-frequency sounds to lower audible frequencies.
- **Functional Gain** – Improvement in hearing thresholds with HA in sound field.
- **Feedback Cancellation** – HA feature preventing whistling sounds.

G

- **Gain** – Increase in sound level provided by a HA.
- **Gaze Nystagmus** – Eye movement abnormality used in vestibular testing.
- **Graphical Audiogram** – Visual representation of hearing thresholds.

H

- **HHIE-S (Hearing Handicap Inventory for the Elderly – Screening)** – Questionnaire assessing perceived hearing handicap.
- **Hearing Aid Verification** – Objective measurement to ensure HA matches prescribed targets.
- **Hearing Threshold** – Softest sound detected at a specific frequency.
- **Hybrid Cochlear Implant** – CI combined with HA for residual low-frequency hearing.

I

- **Immittance Testing** – Measures middle ear function (tympanometry, acoustic reflexes).
- **Insertion Gain** – Difference between aided and unaided sound at eardrum.
- **Ipsilateral Reflex** – Reflex measured in same ear as stimulus.

- **Interaural Time Difference (ITD)** – Timing difference between ears, important for localization.

J

- **Jitter** – Variation in frequency of a sound signal, used in voice analysis.
- **Just Noticeable Difference (JND)** – Smallest detectable change in sound intensity or frequency.

K

- **Keratitis / Ear Canal Infection** – Inflammation of ear canal or outer ear.
- **Kappa Statistics** – Used to measure agreement between audiologists or tests.

L

- **Latency** – Time delay between stimulus and neural response.
- **Laser Doppler Vibrometry** – Technique to measure vibrations in cochlea or middle ear.
- **Ling 6 Sounds** – Speech sounds used to check audibility of all speech frequencies.

M

- **Masking** – Using noise in non-test ear to isolate hearing in test ear.
- **Monaural Fitting** – HA in one ear only.
- **Middle Ear Implants (MEI)** – Devices mechanically stimulating ossicles or cochlea.
- **Modulated Tone** – Used in ASSR testing for objective thresholds.
- **Meniere's Disease** – Inner ear disorder causing vertigo, hearing loss, tinnitus, and fullness.

N

- **NAL-NL2** – Prescriptive formula balancing loudness comfort and speech intelligibility.
- **Noise Reduction** – HA feature minimizing background noise.
- **Normal Hearing** – Hearing thresholds ≤ 25 dB HL across frequencies.
- **Non-Linear Amplification** – HA amplifies soft sounds more than loud sounds.

O

- **OAE (Otoacoustic Emissions)** – Sounds generated by the cochlea, used to test hearing objectively.
- **Oscillopsia** – Visual disturbance with head movement, often due to vestibular issues.
- **Otitis Media** – Middle ear infection causing fluid, pain, and hearing loss.
- **Otospongiosis / Otosclerosis** – Abnormal bone growth in middle ear causing conductive hearing loss.
- **Outer Hair Cells (OHC)** – Cochlear cells amplifying sound; damage leads to hearing loss.

P

- **Pure Tone Audiometry (PTA)** – Behavioral test measuring hearing thresholds at specific frequencies.
- **PTA Average** – Average of thresholds at key frequencies, used for fitting HAs.
- **Pediatric Amplification** – HA fitting guidelines for children, ensuring audibility and language access.
- **Prescriptive Formula** – Rule (e.g., NAL-NL2, DSL v5.0) for setting HA gain and output.

- **Probe Tone** – Tone used in tympanometry to measure middle ear compliance.

Q

- **Q-Tip Test** – Gentle ear canal check, never recommended for routine cleaning.
- **Quality of Life Measures** – Questionnaires evaluating patient benefit from HAs.

R

- **Recruitment** – Abnormal loudness growth in sensorineural hearing loss.
- **Real Ear Measurement (REM)** – Objective verification that HA output matches prescription.
- **Retrocochlear Pathology** – Disorders affecting auditory nerve or brainstem pathways.
- **Rinne Test** – Tuning fork test comparing air vs. bone conduction.
- **ROM (Range of Motion)** – Sometimes assessed in vestibular evaluation.

S

- **Sensorineural Hearing Loss (SNHL)** – Hearing loss from inner ear or auditory nerve.
- **Speech Audiometry** – Tests understanding of words or sentences at different levels.
- **Speech Recognition Threshold (SRT)** – Softest level where patient understands 50% of speech.
- **Sound Field Testing** – Evaluates hearing with speakers in a room rather than headphones.

- **SSNHL (Sudden Sensorineural Hearing Loss)** – Rapid-onset unexplained SNHL.

T

- **Tinnitus** – Perception of ringing or noise without external source.
- **Tympanometry** – Measures middle ear pressure and compliance.
- **Transducer** – Device delivering sound to ear (insert earphone, bone oscillator).
- **TM (Tympanic Membrane)** – Eardrum separating outer and middle ear.
- **Threshold** – Softest sound a person can hear at a given frequency.

U

- **Unilateral Hearing Loss (UHL)** – Hearing loss in one ear only.
- **Utricle** – Part of vestibular system detecting linear acceleration.
- **Use-Dependent Plasticity** – Brain adapts to auditory input or deprivation.

V

- **VRA (Visual Reinforcement Audiometry)** – Behavioral test for young children using visual rewards.
- **Vestibular Rehabilitation** – Exercises to improve balance after vestibular disorders.
- **VNG (Videonystagmography)** – Eye movement test for vestibular function.
- **Vertigo** – Sensation of spinning or motion.
- **VR (Virtual Reality) Audiology** – Emerging tool for simulating real-world hearing scenarios.

W

- **Wave I–V (ABR)** – Peaks in ABR representing neural pathway activity.
- **Wireless HA** – Hearing aid that communicates with other devices via Bluetooth.
- **WIPI (Word Intelligibility by Picture Identification)** – Pediatric speech perception test.
- **Whisper Test** – Quick bedside screening for hearing.
- **Word Recognition Score (WRS)** – Percentage of correctly identified words at a comfortable level.

X

- **Xerostomia** – Dry mouth sometimes affecting HA retention (ear canal skin).
- **X-linked Deafness** – Genetic hearing loss inherited on X chromosome.

Y

- **Yaw Rotation** – Head movement in horizontal plane, used in vestibular testing.
- **Young's Modulus** – Physical property of ossicles or HA components (stiffness).

Z

- **Zinc-Air Battery** – Common battery type for HAs (sizes 10, 13, 312, 675).
- **Z-score (Audiology)** – Standard deviation score sometimes used in research for thresholds.
- **Zero dB HL** – Reference level for normal hearing.

Principles of Evidence-Based Audiology Report Writing

What Does “Evidence-Based” Mean?

- *It means your report is not just your opinion.*
- *It is based on **research evidence** + **clinical experience** + **patient needs**.*

Example:

- *Not just “Recommend hearing aids.”*
- *But: “Recommend binaural digital hearing aids, supported by AAA (2012) guidelines, to improve speech understanding in noise.”*

The 3 Golden Rules

1. **Be Accurate** → *Data and interpretation must match.*
2. **Be Clear** → *Use simple, professional language.*
3. **Be Useful** → *Write recommendations that help the next step.*

The Structure of a Good Report

- **Patient Info**
- **Test Conditions**
- **Results**
- **Interpretation**
- **Diagnosis**
- **Recommendations**

Tip: *Write as if your report will be read by someone who has never seen an audiogram before.*

Evidence Corner:

- *American Academy of Audiology (AAA) Guidelines, 2012.*

Common Errors by Fresh Graduates & How to Avoid Them

Why Do New Graduates Struggle?

Almost every fresh graduate has the same story:

- *You finish the test.*
- *You look at the audiogram.*
- *You open the report template.*
- *Then... you freeze.*

Why?

*Because writing the report is not just about copying numbers. It's about **thinking clinically** and **communicating clearly**.*

The Most Common Mistakes

Mistake 1: Copying Numbers Without Meaning

Example of a weak report:

“RT thresholds: 30, 40, 55, 60 dB HL. LT thresholds: 25, 35, 50, 55 dB HL.”

Problem: This is just raw data. The ENT, parent, or speech therapist won't understand the degree, type, or impact.

Correction:

“PTA revealed a bilateral, moderate sloping sensorineural hearing loss (RT: 30–60 dB HL, LT: 25–55 dB HL).”

Mistake 2: Writing Vague Diagnoses

Example:

“Patient has hearing loss.”

Problem: Too general. What type? What degree? Which ear?

Correction:

“Patient has a unilateral mild conductive hearing loss in the left ear, consistent with middle ear dysfunction.”

Mistake 3: Skipping the Recommendations

Example:

“Diagnosis: bilateral SNHL.”

Problem: And then what? The reader doesn’t know the next step.

Correction:

“Diagnosis: bilateral SNHL.

Recommendations: ENT referral, binaural hearing aids trial with real-ear verification, speech therapy referral, audiological follow-up in 6 months.”

Mistake 4: Using Complicated or Jargon-Heavy Language

Example:

“The subject manifested an audiometric threshold elevation of approximately 45 dB HL in the high-frequency region.”

Problem: Too academic. Not reader-friendly.

Correction:

“The patient has a moderate high-frequency hearing loss.”

Mistake 5: Forgetting Reliability

Fresh graduates often forget to mention if the test was reliable.

- *Was the patient cooperative?*
- *Were the responses consistent?*

Example:

“Results are considered reliable as patient responses were consistent across repeated trials.”

Using International Guidelines in Report Writing

Why Guidelines Matter?

Imagine 3 audiologists testing the same patient.

- *One writes: “mild loss.”*
- *Another: “slight to moderate loss.”*
- *Third: “25–40 dB HL hearing impairment.”*

Confusing, right?

Guidelines make sure we all “speak the same language.”

AAA (American Academy of Audiology) Guidelines (2012)

- *Always include: patient info, test reliability, results, interpretation, and recommendations.*
- *No skipping recommendations! (This is where most interns fail).*

ASHA (American Speech-Language-Hearing Association)

- *Use plain language when possible.*
- *Reports must be understandable by non-audiologists too (e.g., parents, teachers).*

Example: Weak vs. Strong Reporting

Weak (No guidelines):

“Patient has some hearing loss in right ear.”

Strong (Guideline-based):

“Right ear: moderate sensorineural hearing loss (average thresholds 45 dB HL), based on WHO classification. Left ear: normal hearing. Results reliable.

Recommendation: *ENT referral + hearing aid trial for right ear.”*

Tip: *Always mention the **degree** of loss.*

Mistake: *Writing “slight loss” or “good hearing” → these are vague, non-standard.*

Evidence Corner:

- *AAA (2012): Audiologic Assessment Guidelines.*
- *ASHA (2004): Report Writing Standards.*

Writing Clear Diagnosis Statements

Why Diagnosis Matters?

Your diagnosis is the **heart of the report**.

If it's vague → the ENT gets confused, the parent worries, the speech therapist has no plan.

If it's clear → everyone knows exactly what's going on.

Think of the diagnosis as the **headline of a newspaper**.

Short, strong, clear.

The Formula for a Strong Diagnosis

A good diagnosis should answer 3 questions:

1. **Which ear?** (right, left, both)
2. **What type?** (conductive, sensorineural, mixed)
3. **What degree?** (mild, moderate, severe, profound)

Bonus: add **configuration** (sloping, flat, rising) if it's useful.

Examples

Weak:

"Patient has hearing loss."

Too general.

Strong:

"Right ear: mild conductive hearing loss, flat configuration. Left ear: normal hearing."

Weak:

“Moderate HL.”

Which ear? Which type?

Strong:

“Bilateral, moderate sloping sensorineural hearing loss.”

Tip: Write your diagnosis in *one clear sentence*.

Mistake: Leaving out type or ear side

Writing Effective Recommendations

Why Recommendations Matter?

The report doesn't end with the diagnosis.

*It must answer the question: “**So what next?**”*

*Think of recommendations as the **GPS for patient care**.*

No directions = everyone is lost.

The Golden Rules

1. *Be **specific** → “ENT referral” not just “medical referral.”*
2. *Be **practical** → “Follow-up in 6 months” not “follow regularly.”*

Examples

Weak:

“Recommend hearing aid.”

Strong:

“Recommend bilateral digital hearing aids with real-ear verification. Trial period to be followed by counseling session.”

Weak:

“Medical referral.”

Strong:

“ENT referral to evaluate middle ear effusion and rule out recurrent otitis media.”

***Evidence Corner:** AAA 2012 recommends reports to always end with recommendations.*

The Art of Audio-Vestibular History Taking & Otoscopic Examination

General Principles of History Taking

Common Mistakes by Juniors:

- *Asking “yes/no” questions instead of open questions.*
- *Jumping to audiological tests without first building rapport.*
- *Not documenting onset, progression, and impact on daily life.*
- *Ignoring associated symptoms (e.g., tinnitus, dizziness, headache).*
- *Overlooking risk factors like family history, noise exposure, or ototoxic drugs.*

Tips:

- *Start with an open invitation: “Tell me about your hearing problem.”*
- *Explore onset (sudden vs gradual), duration, and progression.*
- *Ask about one or both ears, symmetry, and fluctuation.*
- *Always inquire about:*
 - *Noise exposure*
 - *Ototoxic medications*
 - *Family history of hearing loss*
 - *Previous ear surgeries*
 - *Systemic illnesses (diabetes, autoimmune, infections)*

Clinical Example:

*A junior doctor recorded only “deafness in right ear.” Later, the ENT discovered a **sudden sensorineural hearing loss** that required urgent steroids—missed because history lacked detail.*

Hearing-Specific History

Essential Points:

- ***Onset & Duration:*** Sudden onset may suggest viral, vascular, or trauma causes.
- ***Progression:*** Stable, fluctuating, or worsening.
- ***Laterality:*** One ear or both? Symmetrical?
- ***Associated Symptoms:***
 - Tinnitus → inner ear involvement
 - Aural fullness → Meniere's disease or middle ear pathology
 - Otalgia/discharge → otitis media/externa
- ***Impact on Daily Life:*** Communication, work, school.

Common Mistakes:

- Failing to differentiate conductive vs sensorineural clues.
- Overlooking tinnitus or ignoring its effect on quality of life.
- Recording only "hearing loss" without descriptors.

Adult Hearing History

NAME: Sex: Date: Age: File No: **Complaint:**

.....

.....

.....

History of:

Hearing loss/ site: _____ Onset/ Course: _____ Course: _____ Duration: _____

Tinning/ Site: _____ Onset/ Course: _____ Course: _____ Duration: _____

Ear Discharge/ Site: _____ Onset/ Course: _____ Course: _____ Duration: _____

Earache: _____ Headache: _____

Vertigo: _____ Duration: _____

Nausea and Vomiting: _____

Past History:☐ Fever: _____☐ Ototoxic Drugs: _____☐ Diabetes: _____☐ Physical Trauma: _____☐ Hypertension: _____☐ Operations: _____☐ Allergy: _____☐ Noise Exposure: _____☐ Hearing Aid: _____**Family History:**

.....

Consanguinity:

() Yes or () No

Degree:

Vestibular (Balance/Dizziness) History

Structured Questions:

- *What do you mean by dizziness? (vertigo, lightheadedness, imbalance)*
- *Duration of episodes (seconds, minutes, hours, days).*
- *Frequency of attacks.*
- *Triggers (movement, head position, loud sounds, exertion).*
- *Associated symptoms (nausea, vomiting, hearing loss, tinnitus, diplopia, weakness).*

Common Mistakes:

- *Accepting “dizzy” without clarification → missing vestibular vs non-vestibular causes.*
- *Ignoring cardiovascular or neurological risk factors.*
- *Not asking about medications (vestibulotoxic drugs, antihypertensives).*

Tips:

- *Always clarify with: “Can you describe exactly what you feel?”*
- *Distinguish spinning vertigo from lightheadedness.*
- *Red flags → neurological symptoms, persistent imbalance, drop attacks.*

Dizzy Patient History Checklist	
<i>File NO:</i>	<i>Date:</i>
<i>Name:</i> <i>Sex:</i> <i>Age:</i>	
1. Chief Complaint ----- • Onset: ☐ Sudden ☐ Gradual • First episode: _____ • Duration of episodes: ☐ Seconds ☐ Minutes ☐ Hours ☐ Days • Frequency: _____	
2. Symptom Clarification • How do you describe your dizziness? • ☐ Spinning (Vertigo) • ☐ Lightheadedness / Faint feeling • ☐ Imbalance / Unsteadiness • ☐ Blurred vision with movement (Oscillopsia) • ☐ Other: _____	
3. Triggers / Relieving Factors • Triggered by: • ☐ Head movement ☐ Position change ☐ Loud sound ☐ Exertion ☐ None • Relieved by: _____	
4. Associated Symptoms • Ear: • ☐ Hearing loss ☐ Tinnitus ☐ Ear fullness • Neuro: • ☐ Headache ☐ Visual disturbance ☐ Numbness ☐ Weakness ☐ Speech problems • General: • ☐ Nausea/Vomiting ☐ Palpitations ☐ Chest pain ☐ Sweating	
5. Past Medical & Medication History • Previous ear disease/surgery: _____ • Migraine: ☐ Yes ☐ No • Cardiovascular/Diabetes/Thyroid: ☐ Yes ☐ No • Current medications (esp. ototoxic): _____	
7. Family & Social History • Family history of hearing loss / migraine: ☐ Yes ☐ No • Noise exposure: ☐ Yes ☐ No • Smoking ☐ Yes ☐ No Alcohol ☐ Yes ☐ No Caffeine ☐ High ☐ Moderate ☐ Low	
8. Functional Impact • Risk of falls: ☐ Yes ☐ No • Driving difficulties: ☐ Yes ☐ No • Work impact: ☐ Yes ☐ No • Anxiety/Depression: ☐ Yes ☐ No	
Summary (for clinician): _____ _____	

Clinical Example:

*Patient reported “dizziness.” Junior wrote “vertigo.” On deeper questioning, it was actually **orthostatic hypotension**, not vestibular pathology.*

Pediatric Considerations in History

Ask Parents About:

- *Birth and neonatal history (NICU stay, jaundice, ototoxic drugs).*
- *Developmental milestones (speech, language, motor).*
- *Family history of hearing loss or genetic syndromes.*
- *Recurrent ear infections, fevers, meningitis.*

Common Mistakes:

- *Ignoring prenatal/perinatal risk factors.*
- *Not asking about language delay (often first clue of hearing loss).*

Tips:

- *Use caregiver reports and validated questionnaires.*
- *Ask for newborn hearing screening results if available.*

Pediatric Hearing History

*A structured history form designed to capture **risk factors, milestones, and family background** related to pediatric hearing loss.*

- *Focus on **risk factors**: NICU stay > 5 days, jaundice, ototoxic drugs, meningitis, family history.*
- *Include **developmental milestones** (speech, language, motor).*
- *Don't forget **consanguinity and genetic risks**.*

Pediatric hearing history		
NAME:	Sex:	
Date:	Age:	File No:

Complaint and present history:

History Provided By:

Chief Complaint: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐Follow-up ☐ Other:**Prenatal history**

Maternal Bleeding: maternal infection: (e.g., TORCH):

Toxemia of pregnancy: Ototoxic medication exposure: Other prenatal concerns:

Perinatal historyLabor: Gestational Age (Term/Preterm): Twins/Multiple Births: ☐ Yes ☐ No

Birth weight: Birth trauma: others:

Neonatal historyHyperbilirubinemia (Jaundice): ☐ Yes ☐ No. ☐ phototherapy ☐ or exchange transfusionNICU Stay/Incubation > 5 days: ☐ Yes ☐ NoCyanosis: ☐ Yes ☐ No Ototoxic Medications: ☐ Yes ☐ No Mechanical Ventilation: ☐ Yes ☐ No

Others:

Postnatal history

Fever: Mumps: Measles: Meningitis:

Head Trauma: Ototoxic drug exposure postnatally:

Recurrent Ear Infections Gross developmental disorders:

Developmental history☐ Teething at months:☐ Walking at months: ☐ Physical Trauma:☐ Talking: ☐ Time of first word:☐ Time of first sentence: ☐ Number of words at present time:**Consanguinity**Consanguinity between parents: ☐ Yes ☐ No**Family History:**Family history of hearing loss: ☐ Yes ☐ No – Relation:Family history of speech/language problems: ☐ Yes ☐ No – Relation:**Examination**

General examination

Craniofacial Abnormalities: ☐ Yes ☐ No –:

(e.g., microtia, atresia, cleft lip/palate, low-set ears)

Otologic examination EAR LT EAR

Example Report**Complaint:** Speech delay at 3 years.**History:** NICU stay for 7 days, neonatal jaundice treated with phototherapy.

Development: First word at 2 years, walking at 14 months.

Family history: Positive (uncle with congenital HL).

Consanguinity: Yes (first cousins).

Interpretation: Multiple risk factors for congenital HL.

Tips & Pitfalls

Always ask who **provided the history** (parent, caregiver).

Don't miss **neonatal factors** – they're crucial red flags.

Developmental milestones = quick screening for **speech delay severity**.

Otoscopic Examination

Steps:

1. *Position patient comfortably, explain the procedure.*
2. *Use largest speculum that fits comfortably.*
3. *Hold otoscope with pencil grip, rest hand on patient's head for stability.*
4. *Pull auricle: up and back in adults; down and back in infants.*
5. *Inspect external ear canal → wax, discharge, foreign body, swelling.*
6. *Inspect tympanic membrane:*
 - *Color (pearly gray = normal, red = infection, yellow = effusion).*
 - *Transparency (landmarks visible?).*
 - *Position (retracted, bulging, normal).*
 - *Mobility (pneumatic otoscopy if available).*

Common Mistakes:

- *Forgetting to check both ears.*
- *Using too small a speculum → poor visualization.*
- *Not bracing hand → risk of injury if patient moves.*
- *Misinterpreting normal vascularization or light reflex as pathology.*

Tips:

- *Always compare both ears.*
- *Document normal findings as carefully as abnormal ones.*
- *Use video otoscopy for teaching or medico-legal documentation.*

Clinical Example:

*A child was repeatedly diagnosed with “sensorineural hearing loss.” Proper otoscopy later revealed **bilateral impacted wax** as the only cause.*

Integrating History & Otoscopy

- History suggests *the probable site of lesion*.
- Otoscopy helps confirm or exclude external/middle ear pathology.
- Together, they guide whether to proceed with pure tone audiometry, tympanometry, or inner ear tests.

Golden Rule:

“A thorough history and careful otoscopy prevent 50% of diagnostic errors in audiology.”

Pure Tone Audiometry (PTA)

*Pure Tone Audiometry (PTA) is the **gold standard test** for measuring hearing thresholds.*

*It helps determine the **degree, type, and configuration** of hearing loss.*

- *Always test the **better ear first**.*
- *Start at **1000 Hz**, then go up → 2000, 4000, 8000 Hz, then down → 500, 250 Hz.*
- *Use **air conduction** first, then **bone conduction** if needed.*
- *Apply **masking** when there's a significant interaural difference.*
- *Always comment on **test reliability**.*

Basic Audiological Evaluation					
NAME:				Sex:	
Date:		Age:		File No:	

RIGHT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						

LEFT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						

(FREQUENCY IN HERTZ)

CODE

A-C LT

B-C X

 >

MASKED

A-C △ □

B-C []

Reliability:

.....

Type of masking NBN

Masking in: BOTH EARS

For: B-C

Audiometer Model:

EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
				SRT	D.S.
RT		dB	%		
LT		dB	%		
Remarks:					

Right ()

2.4						
2.2						
2.0						
1.8						
1.6						
1.4						
1.2						
1.0						
0.8						
0.6						
0.4						

Left ()

2.4						
2.2						
2.0						
1.8						
1.6						
1.4						
1.2						
1.0						
0.8						
0.6						
0.4						

Acoustic reflex thresholds (dB HL)

Diagnosis:

Frequency		0.5	1	2	4
RT	ART				
LT	ART				

Recommendations:

Example Report

Diagnosis:

Bilateral **sensorineural hearing loss**, moderate degree, sloping configuration, more pronounced at high frequencies.

Recommendations:

- *Candidate for bilateral hearing aids.*
- *Monitor hearing annually.*
- *Counsel on noise protection.*

Reliability: *Good*

Masking: *Narrowband noise applied for bone conduction.*

Tips & Pitfalls

Always double-check masking levels before finalizing.

*Never forget to write **reliability** – it shows your test is valid.*

*Avoid over-reporting; keep your **diagnosis concise** (degree + type + configuration).*

Speech Audiometry

Speech Audiometry evaluates how well the patient can **detect and understand speech**.

It provides functional information beyond pure tones.

- Includes **Speech Reception Threshold (SRT)** and **Word Discrimination Scores (WDS)**.
- SRT should match Pure Tone Average (PTA) within ± 10 dB.
- WDS reflects **clarity**, not sensitivity.
- Use **masking** when needed (same rules as PTA).

EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking SRT D.S.	
RT		dB	%		
LT		dB	%		
Remarks:					

Example Report

Result:

- SRT: Right 30 dB HL, Left 25 dB HL
- WDS: Right 84% at 70 dB HL, Left 92% at 65 dB HL

Interpretation: Consistent with bilateral moderate SNHL. Good speech discrimination.

Tips & Pitfalls

Always compare **SRT** $\leftrightarrow$ **PTA** for consistency.

If WDS is **< 60%**, suspect retrocochlear involvement.

Write % clearly; it reflects communication ability.

Acoustic Immittance (Tympanometry & Reflexes)

Measures middle ear function and stapedius reflexes.

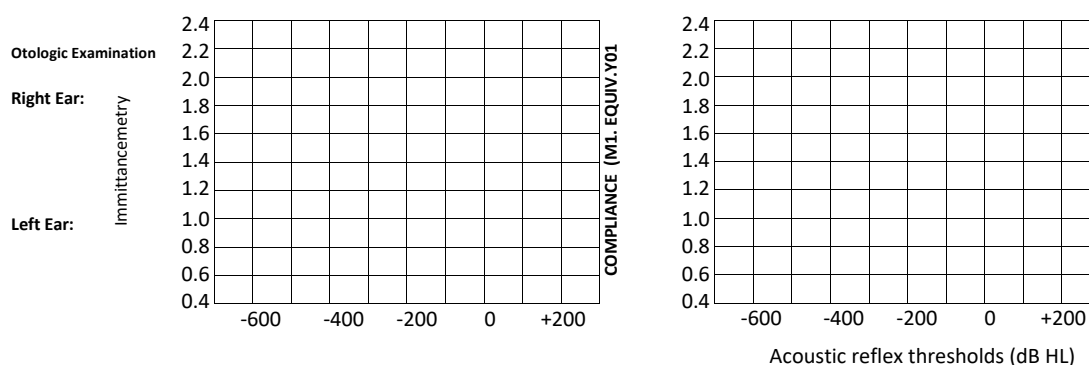
Essential for differentiating conductive vs. sensorineural pathologies.

- *Tympanogram types: A (normal), As (stiff), Ad (floppy), B (flat), C (negative pressure).*
- *Acoustic reflexes confirm neural pathway integrity.*
- *Use 226 Hz probe tone in adults.*

Acoustic immittance tests		
NAME:	Sex:	
Date:	Age:	File No:

Compliant

Tympanogram



Comment:

Frequency	0.5	1	2	4
				KHZ
RT	ART			
LT	ART			

Acoustic immittance measurements were completed using a 226 Hz probe tone.

Bilateral type (A curve) tympanogram

Diagnosis:

- *Bilateral Normal middle ear pressure and normal peak mobility*

Recommendations:

☐ *Monitor middle ear status and repeat tympanometry as needed.*

Acoustic immittance tests

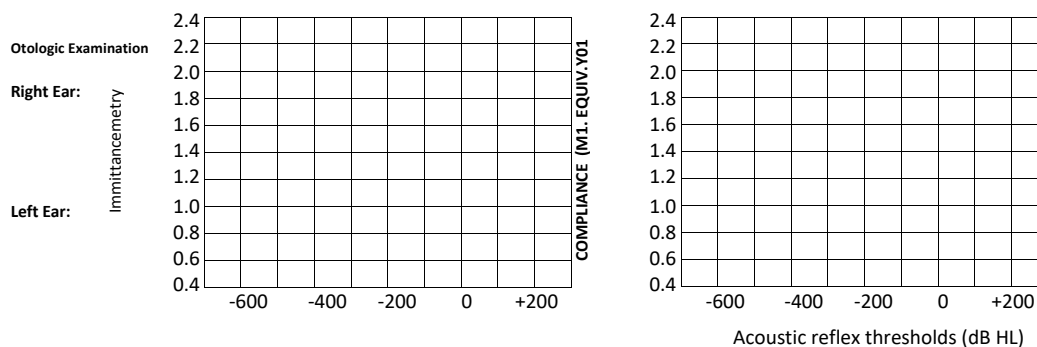
NAME:

Sex:

Date:

Age:

File No:

Compliant**Tympanogram**

Frequency	0.5	1	2	4
RT ART				
LT ART				

Comment:

Acoustic immittance measurements were completed using a 226 Hz probe tone.

Bilateral type (AS curve) tympanogram

Diagnosis:

- *Bilateral **Reduced tympano_ossicular chain mobility** (reduced peak – mobility).*

Recommendations:

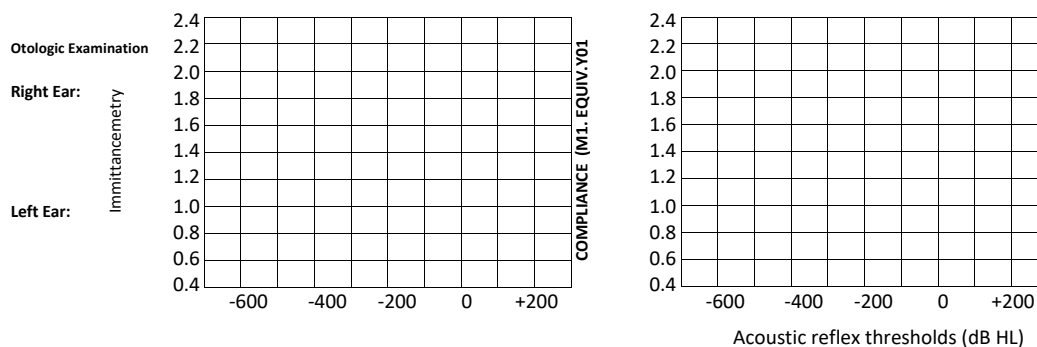
☐ Monitor middle ear status and repeat tympanometry as needed.

☐ ENT consultation

Acoustic immittance tests		
NAME:	Sex:	
Date:	Age:	File No:

Compliant :

Tympanogram



Frequency	0.5	1	2	4
RT ART				
LT ART				

Comment:

Acoustic immittance measurements were completed using a 226 Hz probe tone.

Bilateral type (AD curve) tympanogram

Diagnosis:

- *Bilateral tympano_ossicular chain hyper mobility (elevated peak mobility).*

Recommendations:

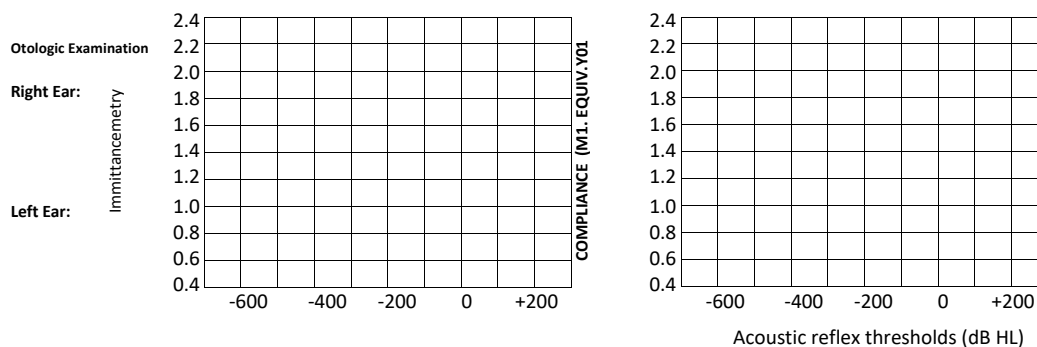
☐ *Monitor middle ear status and repeat tympanometry as needed.*

☐ *ENT consultation*

Acoustic immittance tests		
NAME:	Sex:	
Date:	Age:	File No:

Compliant :

Tympanogram



Comment:

Frequency		0.5	1	2	4
RT	ART				
LT	ART				

Acoustic immittance measurements were completed using a 226 Hz probe tone.

*Bilateral type (**B curve**) tympanogram*

Diagnosis:

- *Bilateral **Restricted** tympano_ossicular chain mobility (no peak- mobility).*

Recommendations:

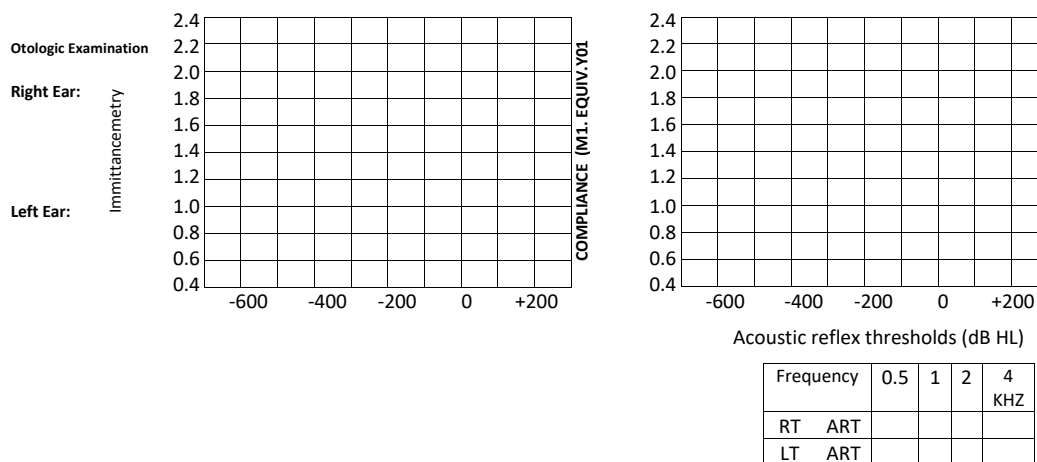
☐ *Monitor middle ear status and repeat tympanometry as needed.*

☐ *ENT consultation*

Acoustic immittance tests		
NAME:	Sex:	
Date:	Age:	File No:

Compliant :

Tympanogram



Comment:

Acoustic immittance measurements were completed using a 226 Hz probe tone.

Bilateral type (C curve) tympanogram

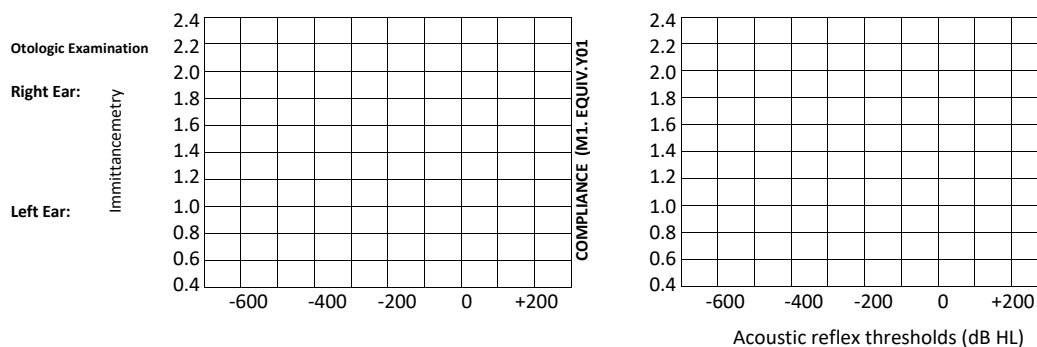
Diagnosis:

- *Bilateral Negative middle ear pressure (Eustachian tube dysfunction).*

Recommendations:

☐ *Monitor middle ear status and repeat tympanometry as needed.*

☐ *ENT consultation*

Acoustic immittance tests**NAME:****Sex:****Date:****Age:****File No:****Compliant****Tympanogram****Comment:**

Frequency		0.5	1	2	4
RT	ART				
	LT				

Acoustic immittance measurements were completed using a 226 Hz probe tone.

- *Right Ear (RT): Type ____ tympanogram*
- *Left Ear (LT): Type ____ tympanogram*

Diagnosis:

- *Right.....*
- *Left.....*

Recommendations:

☐ *Monitor middle ear status and repeat tympanometry as needed.*

☐ *ENT consultation*

Example Report

Result: *Bilateral Type C tympanogram, absent reflexes.*

Interpretation: *Suggestive of Eustachian tube dysfunction.*

Recommendation: *ENT referral for middle ear management.*

Tips & Pitfalls

*Don't forget to specify the **curve type** (A, B, C, As, Ad).*

Reflexes absent $\neq$ always abnormal (depends on degree of HL).

*Mention **probe frequency** (standard 226 Hz in adults).*

Sound Field Audiometry

A behavioral test using warble tones from loudspeakers in a sound-treated room.

Useful for young children who can't cooperate with headphones.

- *Not ear-specific → reflects the better ear.*
- *Best used as screening, not final diagnosis. Often needs confirmation by ABR/OAE*

Sound Field Testing Report

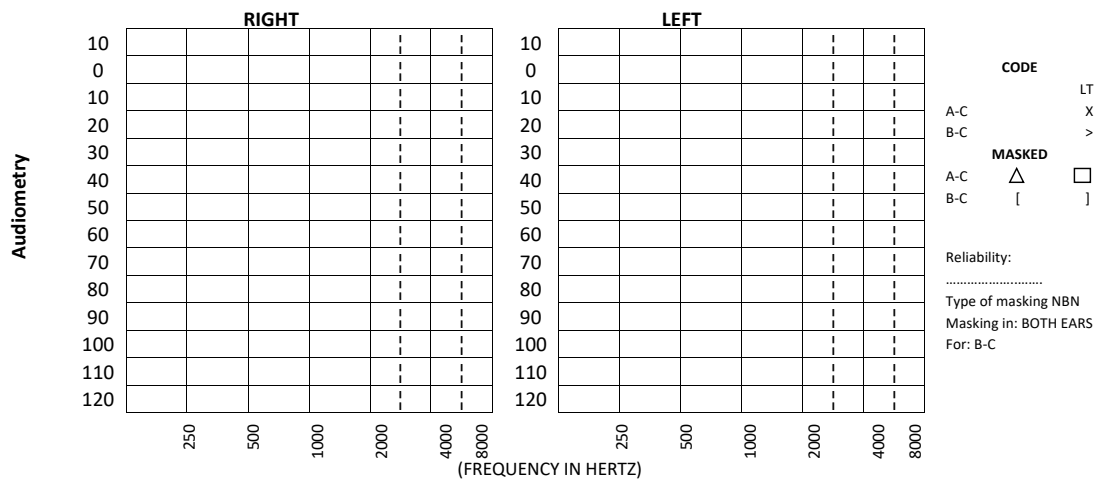
NAME:

Sex:

Date:

Age:

File No:



Audiometer Model:

Arabic Speech Audiometry	EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
					SRT	D.S.
	RT		dB	%		
	LT		dB	%		
Remarks:						
	Right ()				Left ()	

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐
Other: _____

Stimulus Type: Frequency-modulated (FM) warble tones presented via loudspeakers in a calibrated sound-treated room.

Diagnosis:

Sound field audiometry was attempted; however, **reliable behavioral responses could not be obtained** due to Child was **restless and inattentive**, with **inconsistent behavioral reactions** observed throughout the session.

Recommendations:

* **Auditory Brainstem Response (ABR)** testing is recommended to determine frequency-specific and ear-specific auditory thresholds.

* **Acoustic immittance testing** – to evaluate middle ear function.

* **Otoacoustic Emissions (OAEs) Testing** – to assess cochlear (outer hair cell) function.

Example Report

Result: Reliable responses at ~40 dB HL across 500–2000 Hz.

Interpretation: Suggestive of moderate HL in better ear.

Recommendation:

- Refer for ABR to obtain ear-specific thresholds.
- OAE & tympanometry for cross-check.

Tips & Pitfalls

If the child is restless → note “**inconclusive due to poor reliability**”.

Always state that results are **not ear-specific**.

Use **visual reinforcements** (toys, videos) to keep child attentive.

Visual Reinforcement Audiometry (VRA)

*A behavioral test used for infants (6–24 months) where the child is conditioned to turn toward a sound, reinforced with a **visual reward** (toy or video).*

- *Age range: **6 months – 2 years**.*
- *Insert earphones preferred → **ear-specific** results.*
- *Test at 500, 1000, 2000, 4000 Hz.*
- *Replicate thresholds at least **twice** for reliability.*

Visual Reinforcement Audiometry (VRA) Testing Report

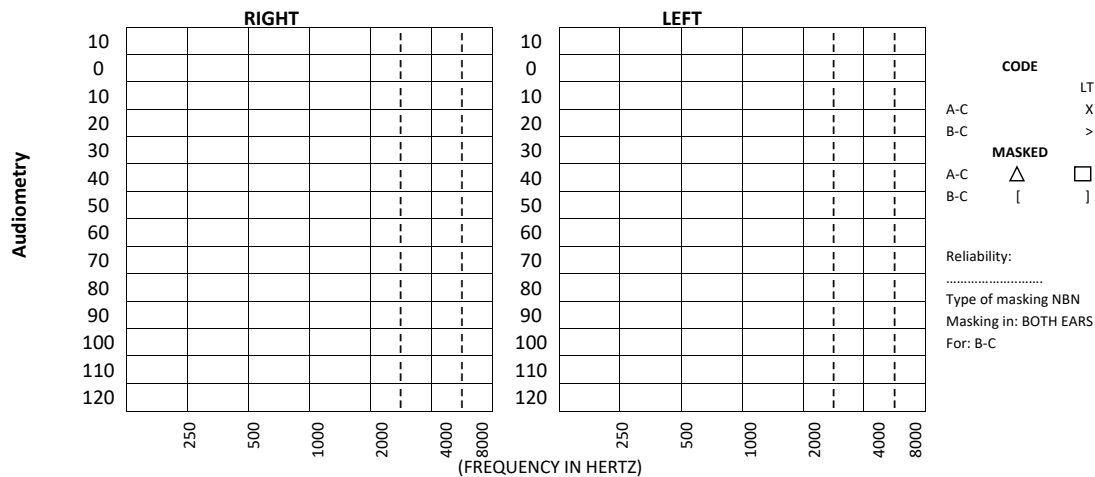
NAME:

Sex:

Date:

Age:

File No:



Audiometer Model:

Arabic Speech Audiometry	EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
	RT		dB	%	SRT	D.S.
	LT		dB	%		
Remarks:						

Right ()

Left ()

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐
 Other: _____

Stimulus Type: Frequency-modulated (FM) warble tones at 500, 1000, 2000, and 4000 Hz

Were presented via Insert earphones (ER-3A) with visual reinforcement through Visual stimuli (e.g., animated toy, video display) in a calibrated sound-treated room.

Reliability Check: Replicate thresholds on at least two separate runs.

RESULT:

Recommendations:

* **Auditory Brainstem Response (ABR)** testing is recommended to determine frequency-specific and ear-specific auditory thresholds.

* **Acoustic immittance testing** – to evaluate middle ear function.

* **Otoacoustic Emissions (OAEs) Testing** – to assess cochlear (outer hair cell) function.

Visual Reinforcement Audiometry (VRA) Testing Report

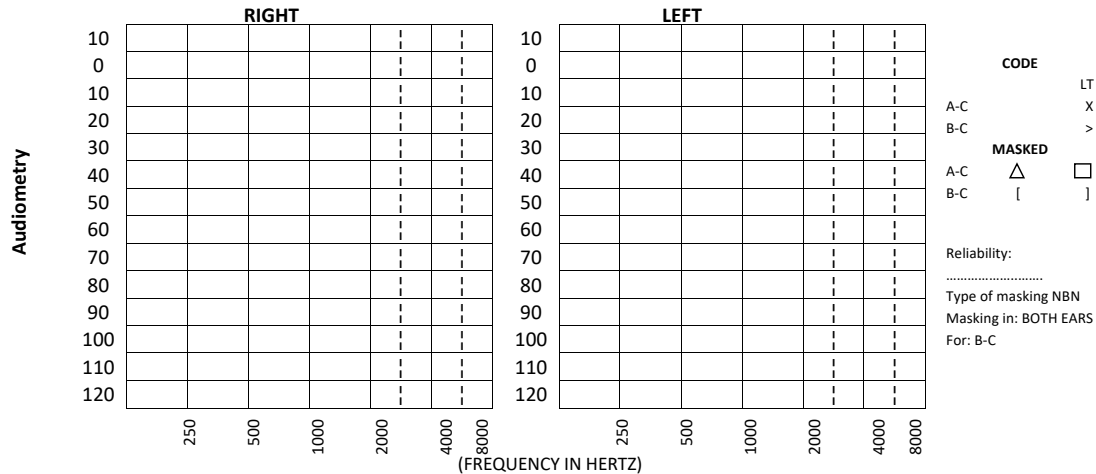
NAME:

Sex:

Date:

Age:

File No:



Audiometer Model:

Arabic Speech Audiometry	EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
					SRT	D.S.
	RT		dB	%		
	LT		dB	%		
	Remarks:					

Right ()

Left ()

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐
Other: _____

Stimulus Type: Frequency-modulated (FM) warble tones at 500, 1000, 2000, and 4000 Hz

Were presented via Insert earphones (ER-3A) with visual reinforcement by Visual stimuli (e.g., animated toy, video display) in a calibrated sound-treated room.

Reliability Check: Replicate thresholds on at least two separate runs.

RESULTS:

Visual Reinforcement Audiometry (VRA) was attempted; however, **reliable behavioral responses could not be obtained** due to Child was **restless and inattentive**, with **inconsistent behavioral reactions** observed throughout the session.

Recommendations:

* **Auditory Brainstem Response (ABR)** testing is recommended to determine frequency-specific and ear-specific auditory thresholds.

* **Acoustic immittance testing** – to evaluate middle ear function.

* **Otoacoustic Emissions (OAEs) Testing** – to assess cochlear (outer hair cell) function.

Example Report

Result: Thresholds ~25 dB HL at 500–2000 Hz, 30 dB HL at 4000 Hz (bilateral).

Interpretation: Near-normal hearing sensitivity.

Recommendation:

- Continue monitoring speech-language development.
- Re-evaluate after 6 months or if concerns persist.

Tips & Pitfalls

If the child is **inattentive** → mention “test inconclusive”.

Always **cross-check** with OAE/ABR.

Reinforcement must be **immediate and consistent** to keep the child engaged.

Conditioned Play Audiometry (CPA)

Conditioned Play Audiometry (CPA)					
Testing Report					
NAME:				Sex:	
Date:		Age:		File No:	

RIGHT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						
	250	500	1000	2000	4000	8000

LEFT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						
	250	500	1000	2000	4000	8000

(FREQUENCY IN HERTZ)

Audiometer Model:

EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
				SRT	D.S.
RT		dB	%		
LT		dB	%		
Remarks:					

Right ()
Left ()

CODE

A-C LT

B-C X

 >

MASKED

A-C △ □

B-C []

Reliability:

.....

Type of masking NBN

Masking in: BOTH EARS

For: B-C

 Arabic
Speech Audiometry

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐

Other: _____

Stimulus Type: Pure tones at 500, 1000, 2000, and 4000 Hz Were presented via Insert earphones (ER-3A) in a calibrated sound-treated room.

Reliability Check: Replicate thresholds on at least two separate runs.

RESULTS:

Conditioned Play Audiometry (CPA) was attempted; however, **reliable behavioral ear-specific responses could not be obtained** as the Child was **restless** and inattentive, The child was unable to consistently engage in Conditioned Play Audiometry (CPA) throughout the session.

Recommendations:

* **Auditory Brainstem Response (ABR)** testing is recommended to determine frequency-specific and ear-specific auditory thresholds.

* **Acoustic immittance testing** – to evaluate middle ear function.

* **Otoacoustic Emissions (OAEs) Testing** – to assess cochlear (outer hair cell) function.

Example Report

Result: *Reliable thresholds at 35–40 dB HL across 500–4000 Hz in both ears.*

Interpretation: *Bilateral moderate SNHL.*

Recommendation:

- *Candidate for bilateral hearing aids.*
- *Schedule fitting + auditory rehabilitation.*

Tips & Pitfalls

*Make testing a **fun game** → more cooperation.*

*Repeat thresholds for **consistency**.*

If child is inattentive → note test as “inconclusive”.

Auditory Brainstem Response (ABR) – Clicks & CE-Chirp®

*ABR is an **objective electrophysiological test** that measures neural synchrony from the auditory nerve to the brainstem.*

- ***Clicks**: broad-spectrum (2–4 kHz region).*
- ***CE-Chirp®**: enhances synchrony → clearer waves, lower thresholds.*
- *Sedation may be needed in infants/children.*
- *Wave V is the **most robust** marker for threshold estimation.*
- *Thresholds are **estimates**, not exact behavioral HL.*

Auditory Brainstem Response (ABR)
Neural Synchrony (*clicks & CE-Chirp®*)

File NO:

Date:

Name: **Sex:** **Age:**

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐ Other: _____

Sedation: ☐ None – Natural Sleep ☐ General Anesthesia

Test Environment: ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: *Rarefaction acoustic clicks and (CE-Chirp®) stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 90 dBnHL down to threshold in 10-20 dB steps.*

Equipment: *Vivosonic Integrity™ ABR system*

Transducer: *Vivosonic Integrity™. Insert Earphones (ER-3C)*

Electrode Montage: *Non-inverting (Active): High forehead (Fz).*

• **Inverting:** *Mastoid / Earlobe.*

• **Ground:** *Low*

forehead.

Number of Sweeps: _____ (2000–4000)

Filter: *30–1500 Hz (infants)*

Impedance Check: *All electrodes $\leq 5\text{ k}\Omega$.*

Inter-electrode difference $\leq 2\text{ k}\Omega$

Result: *Bilateral identifiable and repeatable ABR waves could be detected at 90 dBnHL,*

Wave (V) could be traced down to 30 dBnHL in both ears.

Diagnosis and conclusion:

*ABR results indicate **Bilateral normal neural synchrony**, normal auditory brainstem pathway function, and **hearing sensitivity within normal levels**, with thresholds estimated to be within the 2–4 kHz frequency region.*

Recommendations:

* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry

☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* **Acoustic immittance testing** – to evaluate middle ear function..

* **Monitor Speech & Language Development.**

* **Audiologic follow-up** is recommended, **including frequency-specific Tone Burst ABR with Narrow-Band CE-Chirp® stimuli**, for a more comprehensive evaluation of auditory function.

Auditory Brainstem Response (ABR) Threshold Determination Report – Tone Burst Narrow- Band CE-Chirp®

◆ Stimulus Parameters – Tone Burst ABR

- **Stimulus Type:** Tone Burst (Frequency-specific)
- **Frequencies Tested:**
 - ☐ 500 Hz
 - ☐ 1000 Hz
 - ☐ 2000 Hz
 - ☐ 4000 Hz
- **Polarity:** Alternating.
- **Presentation Rate:** 37.7 or 39.1 stimuli/second.
- **Filter Settings:** 30 – 1500 Hz
- **Averaging:** 2000–4000 sweeps
- **Intensity Levels:** From 80 or 90 dBnHL descending in 10 or 20 dB steps

◆ Results – Tone Burst ABR

Wave V Threshold Estimation

Frequency	Right Ear Threshold	Left Ear Threshold
500 Hz	_____ dBnHL	_____ dBnHL
1000 Hz	_____ dBnHL	_____ dBnHL
2000 Hz	_____ dBnHL	_____ dBnHL
4000 Hz	_____ dBnHL	_____ dBnHL

Correction Factors:

- ABR thresholds are documented in dBnHL values.

• Correction Factors:

	500 Hz	1kHz	Click	2kHz	4kHz
Air Conduction	-20dB	-15dB	-10dB	-10dB	-10dB
Bone Conduction			-20dB		

 Notes:

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)

File NO:

Date:

Name: Sex: Age:

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐ Other: _____

Sedation: ☐ None – Natural Sleep ☐ General Anesthesia

Test Environment: ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: Rarefaction acoustic clicks were presented monaurally at rate of 27.5 p/sec., and intensity of 90 dBnHL down to threshold in 10-20 dB steps.

Equipment: Vivosonic Integrity™.

Transducer: Vivosonic Integrity™. Insert Earphones (ER-3C)

Electrode Montage: Non-inverting (Active): High forehead (Fz)

• Inverting: Mastoid / Earlobe

• Ground: Low forehead

Number of Sweeps: _____ (2000–4000)

Filter: 30–1500 Hz (infants)

Impedance Check: All electrodes $\leq 5 \text{ k}\Omega$.

Inter-electrode difference $\leq 2 \text{ k}\Omega$

Result: Bilateral identifiable and repeatable ABR waves could be traced at 90 dBnHL,

Wave (V) could be traced down to dBnHL in RT ears.

Wave (V) could be traced down to dBnHL in LT ears.

Diagnosis and conclusion:

RT..... hearing Loss at least at frequency region 2-4 KHZ of the audiogram.

LT..... hearing Loss at least at frequency region 2-4 KHZ of the audiogram.

Auditory Brainstem Response (ABR) Threshold Determination Report – Tone Burst Narrow- Band CE-Chirp®

◆ **Stimulus Parameters – Tone Burst ABR**

- **Stimulus Type:** Tone Burst (Frequency-specific)
- **Frequencies Tested:**
 - ☐ 500 Hz
 - ☐ 1000 Hz
 - ☐ 2000 Hz
 - ☐ 4000 Hz
- **Polarity:** Alternating.
- **Presentation Rate:** 37.7 or 39.1 stimuli/second.
- **Filter Settings:** 30 – 1500 Hz
- **Averaging:** 2000–4000 sweeps
- **Intensity Levels:** From 80 or 90 dBnHL descending in 10 or 20 dB steps

◆ **Results – Tone Burst ABR**

Wave V Threshold Estimation

<i>Frequency</i>	<i>Right Ear Threshold</i>	<i>Left Ear Threshold</i>
500 Hz	_____ dBnHL	_____ dBnHL
1000 Hz	_____ dBnHL	_____ dBnHL
2000 Hz	_____ dBnHL	_____ dBnHL
4000 Hz	_____ dBnHL	_____ dBnHL

Correction Factors:

- ABR thresholds are documented in dBnHL values.

• Correction Factors:

	500 Hz	1kHz	Click	2kHz	4kHz
Air Conduction	-20dB	-15dB	-10dB	-10dB	-10dB
Bone Conduction			-20dB		



Notes:

Recommendations:

* ***Otoacoustic Emissions (OAEs) Testing*** – to assess cochlear (outer hair cell) function.

* ***Age-appropriate behavioral audiometry*** ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* ***Acoustic immittance testing*** – to evaluate middle ear function.

* ***ENT (Otolaryngology) Consultation*** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT).

* ***Phoniatric Consultation & Speech Therapy*** – to support speech and language development.

* ***Binaural Hearing Aid Fitting with real-ear verification*** – to support auditory access.

* ***Regular Audiological Follow-Up*** – to monitor hearing levels, hearing aid performance, and progress

Note: *Kindly refer to the attached ABR waveforms for more details.*

Auditory Brainstem Response (ABR)
Neural Synchrony (clicks & CE-Chirp®)

File NO:

Date:

Name:Sex:Age:

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐ Other: _____Sedation: ☐ None – Natural Sleep ☐ General AnesthesiaTest Environment: ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room**Stimulus Type & polarity:** Rarefaction acoustic clicks were presented monaurally at rate of 27.5 p/sec., and intensity of 90 dBnHL down to threshold in 10-20 dB steps.**Equipment:** Vivosonic Integrity™.**Transducer:** Vivosonic Integrity™. Insert Earphones (ER-3C)**Electrode Montage:** Non-inverting (Active): High forehead (Fz)

• Inverting: Mastoid / Earlobe

• Ground: Low forehead

Number of Sweeps: _____ (2000–4000)**Filter settings:** 30–1,500 Hz (infant)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$ **Result:**

*No identifiable or repeatable ABR waves (**Wave V absent**) at maximum stimulus (90 dBnHL) bilaterally.*

Diagnosis and conclusion:

Bilateral severe to profound hearing loss at least at frequency region 2-4 KHZ

Auditory Brainstem Response (ABR) Threshold Determination Report – Tone Burst Narrow- Band CE-Chirp®

◆ Stimulus Parameters – Tone Burst ABR

- **Stimulus Type:** Tone Burst (Frequency-specific)
- **Frequencies Tested:**
 - ☐ 500 Hz
 - ☐ 1000 Hz
 - ☐ 2000 Hz
 - ☐ 4000 Hz
- **Polarity:** Alternating.
- **Presentation Rate:** 37.7 or 39.1 stimuli/second.
- **Filter Settings:** 30 – 1500 Hz
- **Averaging:** 2000–4000 sweeps
- **Intensity Levels:** From 80 or 90 dBnHL descending in 10 or 20 dB steps

◆ Results – Tone Burst ABR

Wave V Threshold Estimation

Frequency	Right Ear Threshold	Left Ear Threshold
500 Hz	_____ dBnHL	_____ dBnHL
1000 Hz	_____ dBnHL	_____ dBnHL
2000 Hz	_____ dBnHL	_____ dBnHL
4000 Hz	_____ dBnHL	_____ dBnHL

Correction Factors:

- ABR thresholds are documented in dBnHL values.

• Correction Factors:

	500 Hz	1kHz	Click	2kHz	4kHz
Air Conduction	-20dB	-15dB	-10dB	-10dB	-10dB
Bone Conduction			-20dB		

 Notes:

Recommendations:

* ***Otoacoustic Emissions (OAEs) Testing*** – for further assess cochlear (outer hair cell) function.

* ***Behavioral audiometry*** test.

* ***ENT (Otolaryngology) Consultation*** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT).

* ***Phoniatric Consultation & Speech Therapy*** – to support speech and language development.

* ***Binaural Hearing Aid Fitting*** –to support auditory access.

* ***Consideration for Cochlear Implantation*** – if limited or no benefit from hearing aids, especially given the severity of the hearing loss and absent ABR response.

* ***Regular Audiological Follow-Up*** – to monitor hearing levels, hearing aid performance, and progress.

****For more relevant details: Kindly refer to the attached ABR waveforms***

Example Report

Result: *Bilateral ABR waves detected at 90 dBnHL. Wave V traced down to 30 dBnHL in both ears.*

Interpretation: *Normal neural synchrony, thresholds within normal limits (2–4 kHz).*

Recommendation: *Follow with age-appropriate behavioral audiometry.*

Tips & Pitfalls

*Always check **impedance** ($< 5 \text{ k}\Omega$) before starting.*

*Note **test condition** (natural sleep vs anesthesia).*

Don't over-interpret – ABR = estimate, not exact audiogram.

Tone Burst ABR (Frequency-Specific Thresholds)

*Tone Burst ABR gives **frequency-specific thresholds** (500, 1000, 2000, 4000 Hz).*

*Used for more accurate **audiogram prediction**.*

- *rate (37.7/s).*
- *Alternating polarity preferred (reduces artifact).*
- *Cross-check with behavioral audiometry when possible.*

***Auditory Brainstem Response (ABR)
Threshold Determination Report – Tone Burst Narrow-
Band CE-Chirp®***

◆ **Stimulus Parameters – Tone Burst ABR**

- **Stimulus Type:** Tone Burst (Frequency-specific)
- **Frequencies Tested:**
 - ☐ 500 Hz
 - ☐ 1000 Hz
 - ☐ 2000 Hz
 - ☐ 4000 Hz
- **Polarity:** Alternating.
- **Presentation Rate:** 37.7 or 39.1 stimuli/second.
- **Filter Settings:** 30 – 1500 Hz
- **Averaging:** 2000–4000 sweeps
- **Intensity Levels:** From 80 or 90 dBnHL descending in 10 or 20 dB steps

◆ **Results – Tone Burst ABR**

Wave V Threshold Estimation

<i>Frequency</i>	<i>Right Ear Threshold</i>	<i>Left Ear Threshold</i>
500 Hz	_____ dBnHL	_____ dBnHL
1000 Hz	_____ dBnHL	_____ dBnHL
2000 Hz	_____ dBnHL	_____ dBnHL
4000 Hz	_____ dBnHL	_____ dBnHL

Correction Factors:

- ABR thresholds are documented in dBnHL values.

• Correction Factors:

	500 Hz	1kHz	Click	2kHz	4kHz
Air Conduction	-20dB	-15dB	-10dB	-10dB	-10dB
Bone Conduction			-20dB		

 **Notes:**

Result:

- RT: 500 Hz = 30 dBnHL, 1000 Hz = 25, 2000 Hz = 25, 4000 Hz = 30
- LT: 500 Hz = 30, 1000 Hz = 30, 2000 Hz = 25, 4000 Hz = 30

Interpretation: Normal to near-normal thresholds across frequencies.

Tips & Pitfalls

Tone Burst = better frequency specificity than clicks.

Low frequencies (500 Hz) may be harder to record → check multiple runs.

*Don't forget to label “**estimated**” thresholds in the report.*

Auditory Neuropathy Spectrum Disorder (ANSD) & Cochlear Microphonic (CM)

ANSD = normal OHC function but abnormal neural synchrony.

- *OAE / CM present*
- *ABR absent or grossly abnormal*

Key Points

- *Use rarefaction & condensation clicks → polarity reversal confirms CM.*
- *Alternating polarity → cancels CM (rules out artifact).*
- *ANSD suspected when CM present but no ABR waves.*

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)

File NO:

Date:

Name:Sex:Age:

Reason for Referral: ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐ Other: _____

Sedation: ☐ None – Natural Sleep ☐ General Anesthesia

Test Environment: ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: **Cochlear Microphonic (CM) Protocol**

Rarefaction, condensation, and alternating clicks with, 27.5 p/sec, 90 dBnHL

To differentiate neural vs. hair-cell responses.

Transducer verification: Insert earphones were acoustically blocked (clamped) during part of CM recording using Rarefaction or Condensation polarity to rule out stimulus artifact.

Equipment: Vivosonic Integrity™ ABR system

Transducer: Vivosonic Integrity™. Insert Earphones (ER-3C)

Electrode Montage: Non-inverting (Active): High forehead (Fz).

• Inverting: Mastoid / Earlobe.

• Ground: Low forehead.

Number of Sweeps: _____ (2000–4000)

Filter: 30–1500 Hz (infants)

Impedance Check: All electrodes $\leq 5 \text{ k}\Omega$.

Inter-electrode difference $\leq 2 \text{ k}\Omega$

Result: No identifiable or repeatable ABR waves (**Wave V absent**) at maximum stimulus (**90 dBnHL**) bilaterally.

Cochlear Microphonic

***Rarefaction & Condensation:** Robust CM detected bilaterally; polarity reversal confirms hair-cell origin .

***Alternating polarity:** CM abolished, indicating true cochlear microphonic presence rather than stimulus artifact.

CM disappeared when insert is clamped.

Diagnosis and conclusion:

Findings are highly suggestive of bilateral auditory neuropathy spectrum disorder (ANSD): absent neural synchronization on ABR with preserved cochlear microphonics.

Recommendations:

*** Otoacoustic Emissions (OAEs) Testing** – to confirm outer hair cell function and support ANSD diagnosis

*** Age-appropriate behavioral audiometry**

☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

*** Acoustic immittance testing** – to evaluate middle ear function.

*** ENT (Otolaryngology) Consultant Consultation** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT) to assess cochlear nerve integrity.

*** Phoniatric Consultation & Speech Therapy** – to support speech and language development.

*** Binaural Hearing Aid Fitting** – to support auditory access. & Consider assistive devices (e.g., FM system, remote microphone) to improve auditory access.

*** Consideration for Cochlear Implantation** – if limited or no benefit from hearing aids.

*** Regular Audiological Follow-Up** – to monitor hearing levels, hearing aid performance, and progress.

Note: Kindly refer to the attached ABR waveforms for more details.

Result: CM robust bilaterally with polarity reversal. ABR absent up to 90 dBnHL.

Interpretation: Findings consistent with **Auditory Neuropathy Spectrum Disorder**.

Recommendation:

- OAE to confirm OHC integrity.
- Trial with hearing aids ± consider CI if limited benefit.
- Speech-language therapy.

Tips & Pitfalls

Always verify CM by **clamping insert** (exclude artifact).

Don't confuse **absent ABR** with profound SNHL → check CM/OAE first.

ANSD = management challenge → multidisciplinary care (ENT + Speech therapy).

(When ABR couldn't be done) Awake and restless child**Auditory Brainstem Response (ABR)**
Neural Synchrony (clicks & CE-Chirp®)**File NO:****Date:****Name:** **Sex:** **Age:****Reason for Referral:** ☐ Failed newborn screening ☐ Speech delay ☐ Family history of hearing loss ☐ Follow-up ☐ Other: _____**Sedation:** ☐ None – Natural Sleep ☐ General Anesthesia**Test Environment:** ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room**Stimulus Type & polarity:** Rarefaction acoustic clicks were presented monaurally at rate of 27.5 p/sec., and intensity of 90 dBnHL down to threshold in 10-20 dB steps.**Equipment:** Vivosonic Integrity™ ABR system**Transducer:** Vivosonic Integrity™. Insert Earphones (ER-3C)**Electrode Montage:** Non-inverting (Active): High forehead (Fz).

• Inverting: Mastoid / Earlobe.

• Ground: Low forehead.

Number of Sweeps: _____ (2000–4000)

Filter: 30–1500 Hz (infants)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$ **Result:****Test could not be reliably interpreted due to excessive movement and high EEG noise levels during recording (awake and restless child).****Diagnosis and conclusion:**ABR testing was **inconclusive** due to poor recording conditions.**No diagnostic information could be obtained.****Recommendations:*** **Reschedule ABR under optimal conditions** (preferably during natural sleep)* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry ☐Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).* **Acoustic immittance testing** – to evaluate middle ear function.* **Consider ABR under General Anesthesia (GA)** following **ENT and Anesthesia Consultation**.

Bone Conduction ABR

Used when ***air conduction ABR cannot be performed*** (atresia, middle ear disease).

Tests cochlear/neural function via ***bone oscillator***.

- Use B-71 or B-81 bone vibrator.
- Often ***no masking possible*** in bilateral atresia.
- Estimates ***better cochlea***, not ear-specific (unless masked).

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)
BONE CONDUCTION

File NO:

Date:

Name: Sex: Age:

Reason for BC ABR: ☐ Atresia, stenosis, or external ear malformation☐ Middle ear dysfunction☐ Other:**Sedation:** ☐ None – Natural Sleep☐ General Anesthesia**Test Environment:** ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: Alternating (to reduce artifact) **acoustic clicks and (CE-Chirp®)** stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 50 dBnHL down to threshold in 10-20 dB steps.
 With **Masking** via Insert earphone (ER 3C) on **contralateral ear**.

Equipment: Vivosonic Integrity™ ABR system**Transducer:** Vivosonic Integrity™. **Bone Oscillator:** B-71 or B-81**Electrode Montage:** Non-inverting (Active): High forehead (Fz).

• Inverting: Earlobe.

• Ground: Low forehead.

Number of Sweeps: (2000–4000)**Filter:** 30–1500 Hz (infants)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$ **Result:**EAR identifiable and repeatable ABR waves could be detected at 50 dBnHL,

Wave (V) could be traced down to 30 dBnHL in The EAR.

Diagnosis and conclusion:

ABR results indicate **normal auditory neural Synchrony, Bone conduction thresholds are estimated to be within the 1–2 kHz frequency region, with peak contribution near 1.5 kHz.**

Recommendations:

* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* **ENT (Otolaryngology) Consultation** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT) and Bone conduction HA.

* **Audiologic follow-up** is recommended, including **frequency-specific Tone Burst ABR with Narrow-Band CE-Chirp® stimuli**, for a more comprehensive evaluation of auditory function.

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)
BONE CONDUCTION

File NO: _____

Date: _____

Name: Sex: Age:

Reason for BC ABR: ☐ Atresia, stenosis, or external ear malformation☐ Middle ear dysfunction☐ Other: _____**Sedation:** ☐ None – Natural Sleep☐ General Anesthesia**Test Environment:** ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: Alternating (to reduce artifact) **acoustic clicks and (CE-Chirp®)** stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 50 dBnHL down to threshold in 10-20 dB steps.
 With **Masking** via Insert earphone (ER 3C) on **contralateral ear**.

Equipment: Vivosonic Integrity™ ABR system**Transducer:** Vivosonic Integrity™. **Bone Oscillator:** B-71 or B-81**Electrode Montage:** Non-inverting (Active): High forehead (Fz).

• Inverting: Earlobe.

• Ground: Low forehead.

Number of Sweeps: _____ (2000–4000)**Filter:** 30–1500 Hz (infants)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$

Result:EAR **NO identifiable and repeatable ABR** waves could be detected at 50 dBnHL,

Wave (V) couldn't be traced at maximum bone conduction stimulation level **50 dBnHL** in
 The EAR.

Diagnosis and conclusion:

ABR results indicate **abnormal auditory neural Synchrony**, and Bone conduction thresholds are estimated to be **outside the normal range** within the 1–2 kHz frequency region, with peak contribution near 1.5 kHz.

Recommendations:

* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* **ENT (Otolaryngology) Consultation** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT).

* **Audiologic follow-up** is recommended, including **frequency-specific Tone Burst ABR with Narrow-Band CE-Chirp®** stimuli, for a more comprehensive evaluation of auditory function.

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)
BONE CONDUCTION

File NO:

Date:

Name: Sex: Age:

Reason for BC ABR: ☐ Atresia, stenosis, or external ear malformation☐ Middle ear dysfunction☐ Other: _____**Sedation:** ☐ None – Natural Sleep☐ General Anesthesia**Test Environment:** ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: Alternating (to reduce artifact) **acoustic clicks and (CE-Chirp®)** stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 50 dBnHL down to threshold in 10-20 dB steps.

Bone conduction ABR was recorded without contralateral masking due to bilateral atresia and absence of external ear access

Equipment: Vivosonic Integrity™ ABR system**Transducer:** Vivosonic Integrity™. **Bone Oscillator:** B-71 or B-81**Electrode Montage:** Non-inverting (Active): High forehead (Fz).

• Inverting: Earlobe.

• Ground: Low forehead.

Number of Sweeps: _____ (2000–4000)**Filter:** 30–1500 Hz (infants)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$ **Result:** identifiable and repeatable ABR waves could be detected at 50 dBnHL,

Wave (V) could be traced down to 30 dBnHL.

Diagnosis and conclusion:

ABR results indicate **normal auditory neural Synchrony**, Bone conduction thresholds are estimated to be within the **1–2 kHz frequency region**, with peak contribution near **1.5 kHz**.

NOTE: Responses reflect the **better hearing cochlea**, and **ear-specific thresholds could not be confirmed** due to absence of **contralateral masking**.

Recommendations:

* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* **ENT (Otolaryngology) Consultation** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT) and Bone conduction HA.

* **Audiologic follow-up** is recommended, including **frequency-specific Tone Burst ABR with Narrow-Band CE-Chirp®** stimuli, for a more comprehensive evaluation of auditory function.

Auditory Brainstem Response (ABR)
Neural Synchrony (Clicks & CE-Chirp®)
BONE CONDUCTION

File NO:

Date:

Name:Sex:Age:

Reason for BC ABR: ☐ Atresia, stenosis, or external ear malformation☐ Middle ear dysfunction☐ Other: _____**Sedation:** ☐ None – Natural Sleep☐ General Anesthesia**Test Environment:** ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room

Stimulus Type & polarity: Alternating (to reduce artifact) acoustic clicks and (CE-Chirp®) stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 50 dBnHL down to threshold in 10-20 dB steps.

Bone conduction ABR was recorded without contralateral masking due to bilateral atresia and absence of external ear access

Equipment: Vivosonic Integrity™ ABR system**Transducer:** Vivosonic Integrity™. **Bone Oscillator:** B-71 or B-81**Electrode Montage:** Non-inverting (Active): High forehead (Fz).• **Inverting:** Earlobe.• **Ground:** Low forehead.**Number of Sweeps:** _____ (2000–4000)**Filter:** 30–1500 Hz (infants)**Impedance Check:** All electrodes $\leq 5 \text{ k}\Omega$.Inter-electrode difference $\leq 2 \text{ k}\Omega$ **Result:** **NO identifiable and repeatable ABR** waves could be detected at 50 dBnHL,Wave (V) couldn't be traced at maximum bone conduction stimulation level **50 dBnHL**.**Diagnosis and conclusion:**

ABR results indicate **Abnormal auditory neural Synchrony**, and Bone conduction thresholds are estimated to be **outside the normal range** within the **1–2 kHz frequency region**, with peak contribution near **1.5 kHz**.

NOTE: **Ear-specific thresholds could not be confirmed** due to absence of contralateral masking.

Recommendations:

* **Age-appropriate behavioral audiometry** ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry).

* **ENT (Otolaryngology) Consultation** – for further evaluation, counseling, and consideration of imaging studies (e.g., MRI/CT).

* **Audiologic follow-up** is recommended, including **frequency-specific Tone Burst ABR with Narrow-Band CE-Chirp® stimuli**, for a more comprehensive evaluation of auditory function.

Auditory Brainstem Response (ABR) Neural Synchrony (Clicks & CE-Chirp®) BONE CONDUCTION	
File NO:	Date:
Name: Sex: Age:	
Reason for BC ABR: ☐ Atresia, stenosis, or external ear malformation ☐ Middle ear dysfunction ☐ Other:	
Sedation: ☐ None – Natural Sleep ☐ General Anesthesia	
Test Environment: ☐ Sound-treated booth ☐ Quiet hospital room ☐ Operating room	
Stimulus Type & polarity: <u>Alternating</u> (to reduce artifact) acoustic clicks and (CE-Chirp®) stimuli (to enhance neural synchrony across frequency regions) were presented monaurally at rate of 27.5 p/sec., and intensity of 50 dBnHL down to threshold in 10-20 dB steps. With Masking via Insert earphone (ER 3C) on contralateral ear .	
Equipment: Vivosonic Integrity™ ABR system Transducer: Vivosonic Integrity™. Bone Oscillator: B-71 or B-81 Electrode Montage: Non-inverting (Active): High forehead (Fz). • Inverting: Earlobe. • Ground: Low forehead.	
Number of Sweeps: (2000–4000) Filter: 30–1500 Hz (infants)	
Impedance Check: All electrodes $\leq 5\text{ k}\Omega$. Inter-electrode difference $\leq 2\text{ k}\Omega$	
Result: <i>Test could not be reliably interpreted due to excessive movement and high EEG noise levels during recording (awake and restless child).</i>	
Diagnosis and conclusion: ABR testing was inconclusive due to poor recording conditions. No diagnostic information could be obtained.	
Recommendations: * Reschedule ABR under optimal conditions (preferably during natural sleep) * Age-appropriate behavioral audiometry ☐ Visual Reinforcement Audiometry ☐ Conditioned Play Audiometry ☐ Behavioral Observation Audiometry). * Acoustic immittance testing – to evaluate middle ear function. * Consider ABR under General Anesthesia (GA) following ENT and Anesthesia Consultation.	

Result: Wave V traced down to 30 dBnHL via BC ABR.

Interpretation: Normal cochlear sensitivity ~1.5 kHz region.

Note: Ear-specific thresholds not confirmed due to lack of masking.

Tips & Pitfalls

Always state if masking was used.

*Without masking = response reflects **better ear only**.*

Useful for congenital atresia → supports BC hearing aid or CI planning.

Distortion Product Otoacoustic Emissions (DPOAEs)

DPOAEs are low-level sounds generated by the cochlea (outer hair cells) in response to two pure tones (f_1 , f_2).

*They test **OHC integrity** across a wide frequency range (0.5–8 kHz).*

- *Stimuli: Two tones (f_1 & f_2) at specific ratios.*
- *Present if hearing thresholds are **better than ~45–55 dB HL**.*
- *Absent when OHCs are damaged.*
- *Used in **screening & cross-check** (newborns, children, adults).*

Distortion Product Otoacoustic Emissions (DPOAEs)

NAME:

Sex:

File No:

Date:

Age:

Stimuli: Paired pure tones (f_1 and f_2) at standard clinical levels.

Frequency Range Tested: 0.5 – 8 kHz.

Criteria for Response: Signal-to-noise ratio (SNR) $\geq$ 6 dB.

Result:

DPOAEs are ***present bilaterally***, indicating ***normal outer hair cell (OHC) function in both ears***. These findings suggest hearing thresholds better than ***45–55 dB HL*** across the ***0.5–8 kHz*** frequency range of the audiogram.

Recommendations:

◆ ◆ ***Kindly Refer to the Auditory Brainstem***

Response (ABR) report for further auditory pathway evaluation and threshold estimation.

<i>Distortion Product Otoacoustic Emissions (DPOAEs)</i>		
NAME:	Sex:	File No:
Date:	Age:	

Stimuli: Paired pure tones (***f1 and f2***) at standard clinical levels.

Frequency Range Tested: 0.5 – 8 kHz.

Criteria for Response: Signal-to-noise ratio (SNR) $\geq$ 6 dB.

Result:

DPOAEs are **Absent** bilaterally, reflecting bilateral **OHCs dysfunction**, and suggesting hearing threshold worse than **45 - 55 dBHL** in frequency range (0.5-8KHZ) of the audiogram.

Recommendations:

◆ ◆ Refer to the **Auditory Brainstem Response**

(**ABR**) report for further auditory pathway evaluation and threshold estimation.

Distortion Product Otoacoustic Emissions (DPOAEs)

NAME:

Sex:

File No:

Date:

Age:

Stimuli: Paired pure tones (f_1 and f_2) at standard clinical levels.

Frequency Range Tested: 0.5 – 8 kHz.

Criteria for Response: Signal-to-noise ratio (SNR) $\geq$ 6 dB.

Result:

Outcome: Incomplete.

Reason: Test was stopped due to infant excessive movement during testing.

Interpretation: No reliable data obtained.

Recommendations:

- ◆ ◆ ***Reschedule a follow-up appointment for repeat DPOAE testing under optimal conditions (e.g., infant asleep or calm).***

Example Report

Result: Robust DPOAEs bilaterally across 0.5–8 kHz.

Interpretation: Normal OHC function, thresholds better than ~45 dB HL.

Recommendation: Continue routine follow-up.

5. Tips & Pitfalls

OAEs **don't measure hearing** – they measure OHC function.

Absent OAEs can mean HL **or** middle ear problem (fluid, wax, etc.).

Always interpret with **tymp & ABR**.

Transient Evoked Otoacoustic Emissions (TEOAEs)

*TEOAEs are sounds generated by the cochlea in response to **click stimuli**.*

*They cover a frequency range of **0.5–4 kHz**.*

- *Stimulus: Clicks (~80 dB SPL).*
- *Present if thresholds are **better than ~30 dB HL**.*
- *Used mainly in **newborn hearing screening**.*
- *Quick, sensitive, non-invasive.*

Transient Evoked Otoacoustic Emissions (TEOAEs)

NAME:	Sex:	File No:
Date:	Age:	

- **Stimulus:** Clicks (80–85 dB SPL peak equivalent).
- **Frequency Range Assessed:** 0.5 – 4 kHz.
- **Pass Criteria:** signal-to-noise ratio (SNR) ≥ 3 dB as the pass criterion for TEOAEs.

Result:

*Bilateral (**PASS**) TEOAEs reflecting bilateral **normal OHCs function**, and suggesting hearing threshold better than 30 dBHL in frequency range (0.5- 4KHZ) of the audiogram.*

Recommendations:

- ◆ ◆ Refer to the **Auditory Brainstem Response (ABR)** report for further auditory pathway evaluation and threshold estimation.

Transient Evoked Otoacoustic Emissions (TEOAEs)

NAME:

Sex:

File No:

Date:

Age:

- **Stimulus:** Clicks (80–85 dB SPL peak equivalent).
- **Frequency Range Assessed:** 0.5 – 4 kHz.
- **Pass Criteria:** signal-to-noise ratio (SNR) ≥ 3 dB as the pass criterion for TEOAEs.

Result:

Bilateral (**Refer**) response TEOAEs reflecting bilateral **OHCs dysfunction**, and suggesting hearing threshold likely worse than 30 dBHL in frequency range (0.5-4KHZ) of the audiogram.

Recommendations:

◆ ◆ Refer to the **Auditory Brainstem Response (ABR)** report for further auditory pathway evaluation and threshold estimation.

Transient Evoked Otoacoustic Emissions (TEOAEs)

NAME:

Sex:

File No:

Date:

Age:

- **Stimulus:** Clicks (80–85 dB SPL peak equivalent).
- **Frequency Range Assessed:** 0.5 – 4 kHz.
- **Pass Criteria:** signal-to-noise ratio (SNR) ≥ 3 dB as the pass criterion for TEOAEs.

Result:***Outcome: Incomplete.******Reason:*** Test was stopped due to infant excessive movement during testing.***Interpretation:*** No reliable data obtained.**Recommendations:**

- ◆ ◆ ***Reschedule a follow-up appointment for repeat TEOAE testing under optimal conditions (e.g., infant asleep or calm).***

Example Report

Result: Bilateral PASS – TEOAEs present across 0.5–4 kHz.

Interpretation: Normal OHC function, thresholds better than 30 dB HL.

Recommendation:

- If risk factors present → follow up with ABR.
- If no risk factors → routine monitoring only. Tips & Pitfalls TEOAEs are **more sensitive** than DPOAEs for mild HL.
Fails can be due to **vernix, middle ear fluid, or crying baby**.
Always rescreen if initial test is inconclusive.

Auditory Steady State Response (ASSR)

ASSR is an *objective electrophysiological test* that estimates hearing thresholds across multiple frequencies simultaneously, using continuous modulated tones.

- Advantage: Provides *frequency-specific & ear-specific thresholds*.
- Often used when *ABR is absent* or inconclusive.
- Frequencies tested: 500, 1000, 2000, 4000 Hz.
- Results reported as *estimated thresholds (dB nHL → eHL)*.
- Can test *both ears & multiple frequencies* at once.
- Useful in *profound HL & CI candidacy assessment*.

ASSR (Auditory Steady-State Response) Report

File NO: _____

Date: _____

Name: **Sex:** **Age:**

Purpose of the Test

- Assess hearing thresholds in both ears.

Test Method

- ASSR measures brain responses to continuous modulated tones at specific frequencies.

- **Tested Ear:** Right / Left / Both

- **Frequencies Tested:** 500, 1000, 2000, 4000 Hz

- **Stimulus Delivery:** Insert earphones or headphones

- **Recording:** Scalp electrodes detect neural responses

Results and Interpretation

- ASSR provides an objective measurement of hearing thresholds for each frequency.

- Findings indicate:

- **Right ear:** -----

- **Left ear:** -----

*** Results Consistent with ABR.**

Kindly refer to the attached ABR report for more details.

Example Report

Result:

- RT: 500 Hz = 80 eHL, 1000 Hz = 85 eHL, 2000 Hz = 90 eHL, 4000 Hz = 95 eHL
- LT: 500 Hz = 80 eHL, 1000 Hz = 85 eHL, 2000 Hz = 90 eHL, 4000 Hz = 95 eHL

Interpretation: Bilateral severe-to-profound SNHL.

Recommendation: Candidate for cochlear implant evaluation.

Tips & Pitfalls

Use when ABR absent → gives thresholds where ABR cannot.

*Always convert **nHL** → **eHL** using correction factors.*

Time-consuming → needs patient cooperation or sedation.

Electrocochleography (ECochG)

ECochG records electrical potentials from the cochlea and auditory nerve. It's mainly used to diagnose Meniere's disease / endolymphatic hydrops and sometimes auditory neuropathy.

- *Measures:*
 - *SP (Summating Potential) = hair cell activity*
 - *AP (Action Potential) = auditory nerve firing*
- *The SP/AP ratio > 0.4 is suggestive of Meniere's disease.*
- *Can be performed transtympanic (needle electrode) or extratympanic.*

Electrocochleography (ECochG) Report***File NO:******Date:******Name:*** ***Sex:*** ***Age:******Electrode:*** ☐ *Transtympanic* ☐ *Extratympanic****Stimulus:*** *Clicks (80–95 dB nHL)****Filter:*** *10–1500 Hz****Results:******SP amplitude:*** ____ μV ***AP amplitude:*** ____ μV ***SP/AP ratio:*** ____***Interpretation:*** _____***Recommendations:*** _____

Example Report

Result:

SP amplitude: 0.45 μV

AP amplitude: 0.8 μV

SP/AP ratio = 0.56

Interpretation: *Abnormally elevated SP/AP ratio → consistent with endolymphatic hydrops (Meniere's disease).*

Recommendation: *ENT follow-up, medical management for Meniere's.*

Tips & Pitfalls

*Always report **SP/AP ratio** clearly.*

Transtympanic = more accurate, but invasive.

ECochG is supportive, not diagnostic alone → always combine with VNG, audiometry.

Videonystagmography (VNG)

*VNG objectively records **eye movements (nystagmus)** to assess vestibular function.*

*It includes **oculomotor, positional, and caloric tests**.*

Key Points

- *Most common test for **peripheral vs central vestibular disorders**.*
- *Tracks eye movement using infrared cameras.*
- *Caloric irrigation is often part of VNG battery.*

Videonystagmography (VNG) Report	
File NO:	Date:
Name: Sex: Age:	
1. Indication for Test • ☐ Vertigo ☐ Imbalance ☐ Dizziness ☐ Other: _____	
2. Calibration • ☐ Normal ☐ Abnormal (specify): _____	
3. Oculomotor Tests • Saccades: ☐ Normal ☐ Abnormal → _____ • Smooth Pursuit: ☐ Normal ☐ Abnormal → _____ • Optokinetic Test: ☐ Normal ☐ Abnormal → _____	
4. Gaze Test • ☐ No spontaneous/gaze nystagmus • ☐ Nystagmus observed (describe: direction, fixation suppression, intensity): _____	
5. Positional & Positioning Tests • Dix-Hallpike Maneuver: • ☐ Negative • ☐ Positive (Right / Left): _____ • Supine Roll Test: • ☐ Negative • ☐ Positive (Right / Left): _____ • Notes: _____	
6. Caloric Test • Right ear Warm: _____ %/s • Right ear Cool: _____ %/s • Left ear Warm: _____ %/s • Left ear Cool: _____ %/s • Unilateral Weakness (UW): _____ % • Directional Preponderance (DP): _____ % • Comments: _____	
7. Interpretation / Impression • ☐ Normal VNG • ☐ Peripheral vestibular involvement → _____ • ☐ Central findings → _____	
8. Recommendations • ☐ ENT/Audiology follow-up • ☐ Vestibular rehabilitation • ☐ Further imaging (MRI/CT) • ☐ Other: _____	

Result: Normal gaze, pursuit, and saccades.

Caloric test: Reduced response (35%) in left ear.

Interpretation: *Left unilateral vestibular weakness.*

Recommendation: *Vestibular rehab therapy + ENT follow-up.*

Tips

Always mention % unilateral weakness (Jongkee's formula).

Note if central signs present (abnormal pursuit/saccades).

Don't interpret calorics alone—combine with full VNG.

Caloric Test

*A subtest of VNG that stimulates the **horizontal semicircular canal** using warm & cold air/water.*

- *Normal response: nystagmus (COWS → Cold Opposite, Warm Same).*
- *Unilateral weakness >25% = significant.*
- *Bilateral weakness = may indicate ototoxicity or bilateral vestibulopathy.*

Caloric Test Report

File NO: _____

Date: _____

Name: *Sex:* *Age:*

Caloric Test Report

Stimulus: Air / Water (30°C, 44°C)

Response: _____

Unilateral Weakness: ____ %

Bilateral Weakness: ☐ *Present* ☐ *Absent*

Interpretation: _____

Recommendations: _____

Example Report

Result: *Right ear reduced response by 40%.*

Interpretation: *Right vestibular hypofunction.*

Recommendation: *Vestibular rehab, repeat after 6 months.*

Video Head Impulse Test (vHIT)

*A quick, non-invasive test measuring **VOR (Vestibulo-Ocular Reflex)** using small, rapid head movements.*

- *Assesses all **6 semicircular canals**.*
- *Measures **gain** (eye velocity / head velocity).*
- *Normal gain $\approx 0.8-1.0$.*
- *Overt/covert saccades = vestibular deficit.*

Video Head Impulse Test (vHIT)		
File NO:		Date:
Name: Sex: Age:		
Canals Tested: ☐ Horizontal ☐ Anterior ☐ Posterior Gain: RT ____ LT ____ Saccades: ☐ Present ☐ Absent Interpretation: Recommendations:		

Example Report

Result: Horizontal canal gain reduced ($RT = 0.55$). Covert saccades observed.

Interpretation: Right horizontal canal hypofunction.

Recommendation: Vestibular rehab therapy.

Vestibular Evoked Myogenic Potentials (VEMP)

VEMP tests otolith function:

- **cVEMP** (cervical) → saccule + inferior vestibular nerve.
- **oVEMP** (ocular) → utricle + superior vestibular nerve.
- Stimulus: Loud clicks or tone bursts.
- cVEMP: Recorded from **sternocleidomastoid muscle**.
- oVEMP: Recorded from **extraocular muscles**.
- Absent/abnormal response = otolith dysfunction.

Vestibular Evoked Myogenic Potentials (VEMP)***File NO:******Date:******Name:*** ***Sex:*** ***Age:******Test:*** ☐ *cVEMP* ☐ *oVEMP****Stimulus:*** *Clicks / 500 Hz tone bursts****Amplitude (μV):*** *RT* ____ / *LT* ____***Latency (ms):*** *RT* ____ / *LT* ____***Interpretation:*** _____***Recommendations:*** _____

Example Report

Result: *cVEMP absent in right ear, normal in left.*

Interpretation: *Right saccular / inferior vestibular nerve dysfunction.*

Recommendation: *Correlate with clinical findings, vestibular rehab.*

Hearing Aid selection, fitting, verification, and validation

hearing aid selection, fitting, verification, and validation based on a patient's audiological profile.

ensures the hearing aid provides audibility, comfort, and functional benefit for real-life listening.

- **Hearing Aid Style:** BTE, RIC, ITE, ITC, CIC, or custom styles.
- **Ear Mold & Venting:** Soft/hard material, custom fit, vent size.
- **Battery & Power:** Sizes 10, 13, 312, 675; power based on hearing loss severity (S/M/P/UP).
- **Features:**
 - **Essential:** Digital multi-channel, directional microphones, noise reduction, frequency lowering.
 - **Non-Essential:** FM, Bluetooth, T-coils, AI programs, wind/impulse noise reduction.
- **Binaural vs Monaural:** Binaural enhances speech-in-noise perception, localization, and prevents auditory deprivation.

Prescriptive Formulas

- **NAL-NL1 / NAL-NL2:** Balances loudness comfort & speech intelligibility (adults).
- **DSL v5.0:** Emphasizes audibility (especially for pediatrics).
- **Notes:** Formula choice should match age, audiogram, and clinical goals.

Verification – Real Ear Measurement (REM)

- **Goal:** Confirm hearing aid output at eardrum matches prescriptive targets.
- **Measurements:**
 - REUR – Real Ear Unaided Response
 - REAR – Real Ear Aided Response
 - REIG – Real Ear Insertion Gain
 - RECD – Real Ear to Coupler Difference (especially for children)
- **Target Matching:** ± 5 dB tolerance at key frequencies (500, 1000, 2000, 4000 Hz).
- **Test Conditions:** Soft (50 dB SPL), Average (65 dB SPL), Loud (80 dB SPL) speech signals.
- **Checkpoints:** REUR/REAR completed, targets matched, gain & loudness balance verified, child response observed.

Validation – Subjective Feedback

- Confirms **functional success** and patient satisfaction in real-life settings.
- **Tools:**
 - **COSI** – Client-Oriented Scale of Improvement
 - **Pediatric Considerations:** Behavioral aided thresholds (VRA/CPA), Ling 6 sounds check, WIPI for speech perception

Name:	Hearing Aid Prescription form	File NO:
--------------	--------------------------------------	-----------------

Age:	Hearing Aid Style	Sex:
-------------	--------------------------	-------------

Behind-the-ear (BTE)

Ear mold: Soft Silicon Hard Acrylic

- Ear mold style:

Vent: Yes No

- Vent size:

Battery size: 675 13

Behind-the-ear (BTE) "Mini"

Ear mold Open fit Slim tube & Ear tip

Battery size: 312 13

Receiver in canal (RIC)

Dome: Open Closed

Power Custom C- shell

Battery: Zinc air (312_10) Rechargeable

- Receiver power: based on hearing loss severity.

• S = Standard • M = Medium • P = Power • UP = Ultra-Power

In-the-ear (ITE) Full Shell	Invisible in the canal (IIC) Micro CIC
<u>Battery size:</u> 13	<u>Battery size:</u> 10

In-the-canal (ITC) Half Shell

Battery size: 312

Completely-in-the-canal (CIC)

Battery size: 10 Custom Vent Instant fit

Hearing Aid Features			
"ESSENTIAL FEATURES"			
- Essential features, according to Type, Degree of hearing loss and audiometric Configuration .			
"Monaural "		"Binaural"	
- Binaural HA fitting enhance speech discrimination in noise , binaural sound localization , binaural, summation and prevent auditory sensory deprivation .			
Digital	Multi - channels	No of channels:	
Multiple Programs	Directional microphones	Feedback cancellation	
Noise reduction	Speech enhancer	Frequency lowering	
Tinnitus Sound therapy			
"NON_ESSENTIAL FEATURES"			
-Non_Essential features, according to patient needs and life-style by (Questionnaire) COSI, APHAB, or HHIE-S questionnaires to guide lifestyle-based choices.			
Bluetooth and wireless connectivity		FM, Remote mic and ALDs	
Direct audio input	T-Coils	Binaural Processing	
Impulse noise reduction	Wind noise reduction	IP- rating	68
Automatic program switching		Artificial intelligence (AI)	
Notes : 			

Hearing Aid Prescriptive formula

NAL – NL1 : (National Acoustic Laboratories' nonlinear fitting procedure, version 1)

NAL – NL2 : (National Acoustic Laboratories' nonlinear fitting procedure, version 2)

DSL V 5.0 : (Desired Sensation Level, version 5)

**Notes :**

- **DSL v5.0** – Emphasizes audibility (especially for pediatrics)
- **NAL-NL2** – Balances intelligibility and loudness comfort

Sound Field ear-specific test for Verification should be done **after Hearing Aid Programming**.

(Regular follow up Aided and unaided tests and follow up are recommended).

Hearing Aid Technical data

- Hearing Aid specifications should meet hearing aid specifications mentioned in the hearing aid **Data Sheet** & should be **Verified** through **2CC Coupler** Measured according to **ANSI** & **Ear Simulator** Measured according to **IEC**.

(Checklist Included)

(OSPL90) (Full-on gain) (Reference test gain) (Frequency Response) (Frequency range bandwidth)
(Total harmonic distortion) (Equivalent input noise level) (Battery Current Drain)

<i>Measurement</i>		<i>2 CC Coupler Measured according to ANSI , IEC.</i>	<i>Ear Simulator Measured according to IEC.</i>
Output sound pressure level 90 OSPL90 <u>dB</u>SPL Gain <u>dB</u>	Peak OSPL90		
	1600HZ		
	HFA-OSPL90		
	Full-on gain (Peak)		
	(FOG) 1600HZ		
	HFA-FOG		
	Reference Test Gain		
Frequency range <u>HZ</u>			
Equivalent input noise <u>dB</u>SPL	OMI		
	DIR		
	500 HZ		
	800 HZ		
Total harmonic distortion (Input 70 dB SPL) %	1600 HZ		
	Battery voltage V		
	Battery current drain mA		
	Battery life (cell zinc air) (rechargeable) h		

Notes _____

Remarks: *This hearing aid prescription is issued solely based on the patient's clinical needs and audiological assessment. The patient is free to obtain their hearing aids from any certified and licensed hearing aid provider. No specific brand, model, or dispensing company is endorsed or preferred.*

Real Ear Measurement (REM) Verification

Goal: Verification (Objective Measures) *To verify that the hearing aid output at the eardrum matches prescriptive targets, providing audibility, comfort, and safety across input levels.*

Measurements Performed

- **REUR** – Real Ear Unaided Response
- **REAR** – Real Ear Aided Response
- **REIG** – Real Ear Insertion Gain
- **RECD** – Real Ear to Coupler Difference (*optional; recommended for pediatrics*)

Target Matching:

- Based on selected prescriptive formula:

DSL v5.0 – Emphasizes audibility (especially for pediatrics)

NAL-NL2 – Adult/Comfort-intelligibility balance

- Match at **key frequencies**: 500 Hz, 1 kHz, 2 kHz, 4 kHz

Tolerance: within **±5 dB** from prescriptive target

Test Conditions:

- *Input levels:*
 - 50 dB SPL (soft)
 - 65 dB SPL (average)
 - 80 dB SPL (loud)
- *Stimulus: **Speech-like signal** (e.g., ISTS or calibrated speech signal)*

*Probe placement: **Within 5mm of eardrum**(critical for accurate readings)*

Checkpoints (Tick boxes):

- ☐ REUR completed
- ☐ REAR completed
- ☐ REIG calculated
- ☐ Targets matched for soft/average/loud input levels
- ☐ Appropriate gain at key frequencies (500 Hz, 1000 Hz, 2000 Hz, 4000 Hz)
- ☐ Comfort and loudness balance checked
- ☐ Child's behavioral response observed (e.g., alerting, vocalizing, smiling)

 **Notes :** _____

Hearing aid Validation

Validation (Subjective Feedback): *Validation confirms that the hearing aid fitting is functionally successful by measuring the **perceived benefit, user satisfaction, and daily communication improvements** in real-world settings.*

◆ **Standardized questionnaires** that assess how the patient perceives their hearing aid performance.

COSI (Client-Oriented Scale of Improvement)

APHAB (Abbreviated Profile of Hearing Aid Benefit)

HHIE/HHIE-S (Hearing Handicap Inventory for the Elderly – Screening)

Hearing Aid Validation in Pediatrics

◆ **Behavioral Aided Thresholds (Functional Audibility)**

VRA or **CPA** in sound field to ensure access to soft speech. aided thresholds should fall between **20–30 dB HL**.

- Consider **Ling 6 Sounds** as a daily check.

◆ **Speech Perception Testing**

- For older toddlers and children
 - **WIPI** (Word Intelligibility by Picture Identification)

*** Evidence-Based Best Practice References:**

- **AAA (American Academy of Audiology) Pediatric Amplification Guidelines.**
- **ASHA Guidelines for Hearing Aid Fitting.**
- **Dillon, H. (2012). Hearing Aids – for verification and prescriptive targets**
- **British Society of Audiology (BSA) 2021 REM Guidelines.**

Tips & Pitfalls

Always document **style, vent, battery, and features**.

Match **REM targets** precisely; small errors affect audibility & comfort.

Binaural fitting preferred unless contraindicated.

Regular follow-up is critical – re-check aided thresholds & patient satisfaction.

*Customize features based on **patient lifestyle questionnaires** (COSI, APHAB, HHIE-S).*

Final Notes

- *Hearing aid prescription **is patient-specific**, evidence-based, and clinically justified.*
- *The patient may obtain devices from any licensed provider – no brand endorsement.*
- *Verification and validation are **mandatory steps** to ensure effective amplification.*

Aided Audiogram

*Sound field test that shows how much benefit the patient gets from **hearing aids**.*

- *Compare aided thresholds with unaided thresholds.*
- *Test at key frequencies: 500, 1000, 2000, 4000 Hz.*
- *Reliability depends on child's/ adult's cooperation.*

Aided Audiogram Report					
NAME:				Sex:	
Date:		Age:		File No:	

RIGHT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						

LEFT

10						
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						

(FREQUENCY IN HERTZ)

Right HA model ()

Left HA model ()

Audiometer Model: ()

Arabic	Speech Audiometry	EAR	SRT	LEVEL OF PRESENTATION	DISCRIMINATION %	Masking	
						SRT	D.S.
		RT					
		LT					
Remarks:							

CODE

A-C LT

B-C X

 >

MASKED

A-C △ □

B-C []

Reliability:

.....

Type of masking NBN

Masking in: BOTH EARS

For: B-C

Stimulus Type: Frequency-modulated (FM) warble tones presented via loudspeakers in a calibrated sound-treated room at 500, 1000, 2000, and 4000 Hz. with reliability revealed

RESULTS:

☐ **Adequate** benefit from amplification

☐ **Partial** benefit from amplification

☐ **No** benefit from amplification

Recommendations :

- **Adjust amplification settings** based on audiogram findings.
- Encourage **regular and consistent use** of hearing aid(s)
- **follow-up** audiological evaluation to monitor progress and amplification benefit

Aided Audiogram Report											
NAME:								Sex:			
Date:				Age:		File No:					

Pure-Tone Audiometry		RIGHT		LEFT		
			10 0 10 20 30 40 50 60 70 80 90 100 110 120		10 0 10 20 30 40 50 60 70 80 90 100 110 120	
			250 500 1000 2000 4000 8000		250 500 1000 2000 4000 8000	
			(FREQUENCY IN HERTZ)			

Right HA model	Left HA model
----------------	---------------

CODE

A-C LT

B-C X

 >

MASKED

A-C △ □

B-C []

Reliability:

Type of masking NBN

Masking in: BOTH EARS

For: B-C

Stimulus Type: Frequency-modulated (FM) warble tones presented via loudspeakers in a calibrated sound-treated room at 500, 1000, 2000, and 4000 Hz. with poor reliability revealed

RESULTS:

Aided Sound field audiometry was attempted; however, **reliable responses could not be obtained** due to Child was **restless and inattentive**, with **inconsistent behavioral reactions** observed throughout the session.

Recommendations :

- ☐ Re-attempt aided audiometry when the child is more alert, attentive, and cooperative.
- ☐ Encourage **regular and consistent use** of hearing aid(s).
- ☐ Monitor amplification use and benefit through, aided questionnaires, or datalogging.
- ☐ Follow up with a repeat behavioral audiological assessment.
- ☐ Consider **objective aided assessment** methods to evaluate benefit from amplification, such as:
 - **Aided Auditory Brainstem Response (ABR)** to assess audibility under amplification.
 - **Cortical Auditory Evoked Potentials (e.g., P1 latency)** to evaluate central auditory pathway development and access to sound.

Example Report

Result: Aided thresholds ~30 dB HL across 500–4000 Hz.

Interpretation: *Adequate benefit from bilateral hearing aids.*

Recommendation:

- *Continue full-time use.*
- *Annual aided testing.*
- *Adjust gain if needed.*

Tips & Pitfalls

*Always test with **hearing aids ON** in the real-ear condition.*

*If child uncooperative → consider **objective aided measures** (ABR, cortical responses).*

Avoid vague comments—state clearly if benefit is adequate, partial, or absent.

Cochlear Implant (CI)

*An electronic device that bypasses damaged cochlear hair cells and directly stimulates the **auditory nerve**, restoring access to sound for patients with severe–profound SNHL.*

- **Candidacy:**
 - *Bilateral severe–profound SNHL.*
 - *Limited benefit from well-fitted hearing aids.*
 - *Poor speech perception scores.*
- **Assessment:** *PTA, ABR/ASSR, OAE, speech tests, imaging (CT/MRI), psychological & counseling sessions.*
- **Follow-up:** *Activation (10–14 days post-op), mapping (T & C levels), auditory-verbal therapy.*

Cochlear Implant Report**File NO:****Date:****Name:** **Sex:** **Age:****Pre-op Assessment:****Audiological results:** _____**Speech perception:** _____**Imaging findings:** _____**Candidacy:** ☐ Suitable ☐ Not suitable**Device Information:****Implant type/model:** _____**Side:** ☐ Right ☐ Left ☐ Bilateral**Post-op:****Activation date:** _____**Mapping (T & C levels):** _____**Programs set:** _____**Progress / Comments:** _____**Recommendations:** _____

Example Report

Pre-op: Bilateral profound SNHL. No benefit from hearing aids. ABR absent bilaterally. MRI: Normal cochlear nerve.

Decision: Suitable for left CI.

Device: MED-EL Synchrony 2, left ear.

Activation: Day 12 post-op. T & C levels within expected range.

Progress: At 6 months – improved speech detection, begins word recognition.

Recommendation: Continue auditory-verbal therapy + 3-monthly mapping.

Tips

Always state **degree/type of HL** clearly.

Include **device model + side**.

Report **mapping values & progress**.

Link recommendations to **rehab plan**.

Auditory Brainstem Implant (ABI)

*An implant that stimulates **the cochlear nucleus in the brainstem** directly, bypassing both cochlea and auditory nerve. Used when CI is not possible.*

- ***Candidacy:***
 - *Absent or non-functional cochlear nerve (e.g., NF2, nerve aplasia).*
 - *Ossified cochlea (post-meningitis).*
 - *CI failure / contraindications.*
- ***Assessment:** MRI to confirm absent cochlear nerve.*
- ***Outcomes:** Provides **sound awareness**; speech understanding is usually limited compared to CI.*

Auditory Brainstem Implant (ABI)***File NO:******Date:******Name:*** ***Sex:*** ***Age:******Pre-op Assessment:******Audiological results:*** _____***Imaging findings:*** _____***Candidacy:*** ☐ *Suitable for ABI****Device Information:******Implant type/model:*** _____***Side:*** ☐ *Right* ☐ *Left****Post-op:******Activation date:*** _____***Mapping results:*** _____***Progress:***☐ *Environmental sound awareness*☐ *Voice detection*☐ *Limited speech understanding****Comments:*** _____***Recommendations:*** _____

Example Report

Pre-op: Bilateral profound SNHL. MRI: Bilateral cochlear nerve aplasia. Not a CI candidate.

Decision: Right ABI implantation.

Device: Cochlear Nucleus ABI541, right side.

Activation: Day 14 post-op. Electrodes mapped, some non-auditory sensations suppressed.

Progress: Environmental sound awareness achieved (doorbell, clapping, traffic sounds). Speech perception minimal.

Recommendation: Continue auditory training + family counseling regarding realistic outcomes.

Tips

Always emphasize **reason for ABI (e.g., absent nerve)**.

Document **non-auditory stimulation** during mapping.

Set **realistic expectations** → awareness of sounds > speech clarity.

Counseling notes are critical.

Bone Conduction Hearing Aids – Non-Surgical

*Softband / headband bone conduction devices deliver sound vibrations to the cochlea via bone conduction **without surgery**.*

- *Used in infants, children with **atresia, microtia, or CHL**.*
- *Often a trial before surgical BAHA.*
- *Indications: CHL, mixed HL with large ABG, single-sided deafness (SSD).*
- *Can be fitted early (as young as 3–6 months).*
- *Document unaided vs aided thresholds.*

Bone Conduction Hearing Aid (Non-Surgical) Report**File NO:****Date:****Name:** **Sex:** **Age:****Device:** ☐ **Softband** ☐ **Headband****Ear:** ☐ **Right** ☐ **Left** ☐ **Bilateral****Aided thresholds:****500 Hz:** ____ **1000 Hz:** ____ **2000 Hz:** ____ **4000 Hz:** ____**Patient tolerance / feedback:** _____**Comments:** _____**Recommendations:** _____

Example Report

Result: Trial with Oticon Ponto Softband. Aided thresholds ~25–30 dB HL across frequencies.

Feedback: Mother reports improved response to name, awareness of sounds.

Recommendation: Continue softband use until age suitable for surgical implantation.

Bone Conduction Hearing Aids – Surgical

*Surgically implanted **titanium fixture** in the skull transmits vibrations directly to cochlea.*

- *Indications: Atresia, chronic otitis media, SSD, mixed HL.*
- *Requires osseointegration (3–6 months post-op).*
- *Document device model, surgical side, aided benefit.*
- *Long-term outcome: improved speech in noise, better localization (SSD).*

Bone Conduction Hearing Aids – Surgical**File NO:****Date:****Name:** **Sex:** **Age:****Surgery date:** _____**Implant model:** _____**Side:** ☐ **Right** ☐ **Left****Aided thresholds:** _____**Speech perception (quiet/noise):** _____**Comments:** _____**Recommendations:** _____

Example Report

Result: *Right-sided BAHA Connect implanted. Aided thresholds ~25 dB HL.*

Speech tests: *90% word recognition in quiet, improved localization.*

Recommendation: *Continue daily use, monitor skin site, follow-up annually.*

Middle Ear Implants (MEI)

Implants (e.g., Vibrant Soundbridge) that mechanically vibrate the ossicles or round window.

- *Option for CHL, mixed HL, or SNHL patients unsuitable for HAs.*
- *Indications: Chronic otitis externa, anatomical anomalies, cosmetic concerns.*
- *Provides more natural sound quality vs BAHA in some cases.*
- *Requires surgical implantation + audiological fitting.*

Middle Ear Implants (MEI)***File NO:*** _____***Date:*** _____***Name:*** ***Sex:*** ***Age:******Implant type/model:*** _____***Implant site:*** ☐ *Incus* ☐ *Stapes* ☐ *Round window****Aided thresholds:*** _____***Speech scores:*** _____***Comments:*** _____***Recommendations:*** _____

Example Report

Result: *Vibrant Soundbridge implanted on left incus. Aided PTA ~30 dB HL.*

Speech scores: *88% in quiet at 65 dB SPL.*

Recommendation: *Annual follow-up + counseling regarding device maintenance.*

FM Systems & Assistive Listening Devices (ALDs)

- ***FM System:** A wireless system where the speaker's voice is transmitted via **frequency modulation** to the listener's receiver.*
- ***ALDs:** Devices that improve listening in specific environments (e.g., classrooms, theaters, phone).*

*They help patients (especially children) hear better in **noise, distance, and reverberation**.*

- ***Indications:***
 - *Children with SNHL using HA or CI (esp. in schools).*
 - *Adults with difficulty understanding speech in noise.*
 - *Patients with Auditory Processing Disorder (APD).*
- ***Types:***
 - *FM systems (personal or soundfield).*
 - *Remote microphones.*
 - *Bluetooth streaming devices.*
- *Always document **improvement in SNR (Signal-to-Noise Ratio)**.*

Tinnitus Assessment & Management

***Tinnitus** = perception of sound (ringing, buzzing, hissing...) without external stimulus.*

- *Affects ~10–15% of population.*
- *Can be **subjective** (most common) or **objective** (rare, vascular/muscular).*
- ***Assessment tools:***
 - *Case history (onset, laterality, triggers).*
 - *Psychoacoustic measures: Pitch & loudness matching.*
 - *Tinnitus Handicap Inventory (THI).*
 - *Minimum Masking Level (MML).*
- ***Management options:***
 - *Counseling + reassurance.*
 - *Hearing aids (for concomitant HL).*
 - *Tinnitus Retraining Therapy (TRT).*
 - *CBT, mindfulness, stress reduction.*
 - *Sound therapy / masking devices.*

Tinnitus Assessment Report**File NO:****Date:****Name:** **Sex:** **Age:****History:****Onset:** _____ **Laterality:** ☐ Right ☐ Left ☐ Bilateral**Description:** ☐ Ringing ☐ Buzzing ☐ Hissing ☐ Other: ____**Associated HL:** ☐ Yes ☐ No**Psychoacoustic Measures:****Pitch match:** _____ Hz**Loudness:** _____ dB SL**MML:** _____ dB SL**Questionnaires:****THI Score:** _____ / 100 → ☐ Mild ☐ Moderate ☐ Severe**Management Plan:**☐ Counseling☐ Hearing Aids☐ Sound Therapy☐ TRT☐ Referral (Psychology/ENT)**Comments:** _____

Example Report

Result: Bilateral high-pitched tinnitus, onset 1 year. Pitch match = 6 kHz, Loudness = 10 dB SL, MML = 15 dB SL. THI score = 52 (moderate).

Interpretation: Moderate tinnitus handicap associated with bilateral SNHL.

Management: Counseling + binaural hearing aids with integrated tinnitus masker. Follow-up in 3 months.

Tips

Always quantify tinnitus impact (THI, VAS scale).

Avoid promising “cure” → focus on **management & habituation**.

Note **co-morbidities** (anxiety, insomnia, depression).

HL patients benefit most from **HA + masking**.

Hyperacusis Assessment & Management

***Hyperacusis** = abnormal sensitivity or intolerance to everyday sounds that are normally well-tolerated (e.g., clapping, traffic, dishes).*

- *Often co-exists with **tinnitus, migraine, autism, head trauma**.*
- *Different from misophonia (emotional reaction to specific sounds).*
- ***Assessment Tools:***
 - *Case history (onset, triggers, impact on life).*
 - ***Loudness Discomfort Levels (LDL):** Normally ~90–100 dB HL; in hyperacusis, often <80 dB HL.*
 - *Questionnaires: Hyperacusis Questionnaire (HQ), Visual Analog Scales (VAS).*
- ***Management Options:***
 - *Counseling & sound education.*
 - *Sound desensitization therapy (gradual exposure).*
 - *Tinnitus Retraining Therapy (if comorbid tinnitus).*
 - *Cognitive Behavioral Therapy (CBT).*

Hyperacusis Assessment Report**File NO:****Date:****Name:** **Sex:** **Age:****History:****Onset:** _____**Triggers:** ☐ Loud speech ☐ Music ☐ Traffic ☐ Others: _____**Associated symptoms:** ☐ Tinnitus ☐ Migraine ☐ Anxiety**Assessment:****LDL (dB HL):****500 Hz:** RT _____ / LT _____**1000 Hz:** RT _____ / LT _____**2000 Hz:** RT _____ / LT _____**4000 Hz:** RT _____ / LT _____**Questionnaire (HQ/VAS):** _____ / _____**Interpretation:** _____**Management Plan:**☐ Counseling☐ Sound therapy / desensitization☐ CBT referral☐ TRT (if tinnitus present)**Comments:** _____

Vestibular Rehabilitation Therapy (VRT)

***Vestibular Rehabilitation Therapy (VRT)** = customized program of exercises to improve **balance, gaze stability, and reduce dizziness** in patients with vestibular disorders.*

- Based on **neuroplasticity** → brain adapts to vestibular loss.
- Main pillars: **Adaptation, Habituation, Substitution.**
- **Indications:**
 - Unilateral vestibular hypofunction (e.g., vestibular neuritis).
 - Bilateral vestibular hypofunction (ototoxicity, meningitis).
 - Persistent dizziness after vestibular disorders.
 - Post BPPV treatment residual imbalance.
- **Common Exercises:**
 - **Gaze stabilization:** X1, X2 viewing.
 - **Balance training:** Standing, walking with reduced visual/proprioceptive cues.
 - **Habituation:** Repeated exposure to symptom-provoking movements.
 - **Functional tasks:** Walking in busy environments.

Vestibular Rehabilitation Therapy Report***File NO:*** _____***Date:*** _____***Name:*** ***Sex:*** ***Age:******Diagnosis:*** _____***Baseline Assessment:******- Dizziness Handicap Inventory (DHI):*** ____ / 100***- Balance tests:*** _____***Therapy Plan:***☐ ***Gaze stabilization exercises***☐ ***Habituation exercises***☐ ***Balance/postural training***☐ ***Functional mobility******Progress Notes:******Week 2:*** _____***Week 4:*** _____***Week 8:*** _____***Outcome:******Improvement in symptoms:*** ☐ ***Yes*** ☐ ***No******DHI final score:*** ____ / 100***Comments:*** _____***Recommendations:*** _____

Newborn Hearing Screening (UNHS)

***Universal Newborn Hearing Screening (UNHS)** = early detection program to identify infants at risk of hearing loss.*

- *Done in the **first days/weeks of life**.*
- *Standard tools: **OAE** (TEOAE / DPOAE) and/or **AABR** (Automated ABR).*
- *Goal: “**1-3-6**” **Rule** → screen by 1 month, diagnose by 3 months, intervene by 6 months.*
- ***First-line:** OAE (quick, non-invasive).*
- ***Second-line / confirmatory:** AABR (better for neural integrity).*
- ***Pass/Refer system:***
 - ***Pass** → no HL suspected (but continue risk monitoring).*
 - ***Refer** → requires diagnostic evaluation.*
- ***High-risk infants:** NICU >5 days, hyperbilirubinemia, family history, syndromes → require **AABR even if OAE normal**.*

Newborn Hearing Screening Report**File NO:****Date:****Name:** **DOB** **Sex:** **Age:****Screening Method:**☐ **OAE (TEOAE / DPOAE)**☐ **AABR****Results:**☐ **Pass – Both ears**☐ **Refer – Right**☐ **Refer – Left**☐ **Refer – Both****Risk Factors:** ☐ **Yes** ☐ **No****If Yes** → _____**Comments:** _____**Recommendations:**☐ **Repeat screening (date: ____)**☐ **Diagnostic ABR / Full evaluation**☐ **Follow-up at 6 months (high-risk)****Result:** OAE screening. Right ear:..... Left ear:.....**Risk factors:** NICU stay > 5 days.**Recommendation:** Schedule diagnostic ABR within 2 weeks. Follow-up as high-risk infant.

Tips

*Always mention **method used (OAE or AABR)**.*

*Note **risk factors** even if screening = Pass.*

Don't use "Fail" in reports → use "Refer" (softer for parents).

*Stress importance of **follow-up** (many lost-to-follow-up cases).*

Auditory Neuropathy Spectrum Disorder (ANSD)

***ANSD** = a hearing disorder where **outer hair cell function is normal (OAEs present)** but **synchrony of neural firing is impaired**.*

- *Site of lesion: Inner hair cells / synapse / auditory nerve.*
- *Patients hear sounds but struggle to **understand speech**, especially in noise.*
- ***Diagnostic Triad:***
 - Present OAEs** (or cochlear microphonic).*
 - Absent or grossly abnormal ABR.***
 - Poor speech discrimination out of proportion to audiogram.***
- *May show **variable audiograms** (normal → profound HL).*
- ***Risk factors:** Prematurity, hyperbilirubinemia, NICU stay, genetic syndromes.*

Auditory Neuropathy Spectrum Disorder Report	
File NO:	Date:
Name: Sex: Age:	
Findings: Pure Tone Audiogram: Speech perception: OAEs: ☐ Present ☐ Absent ABR: ☐ Absent ☐ Abnormal ☐ Present Cochlear Microphonic: ☐ Present	
Interpretation: ☐ Consistent with ANSD	
Management Plan: ☐ Counseling regarding nature of disorder ☐ Hearing Aids trial ☐ Consider Cochlear Implant (if speech poor) ☐ Speech-language therapy ☐ Genetic counseling	
Comments: 	

Example Report

Findings:

- *PTA: Mild to moderate HL bilaterally.*
- *Speech discrimination: 40% at 65 dB HL (poor).*
- *OAEs: Present. ABR: Absent. Cochlear microphonic: Present.*

Interpretation: *Consistent with ANSD.*

Plan: *Counseling + HA trial for environmental awareness, CI candidacy if speech remains poor.*

Tips

Always **cross-check OAEs & ABR** (don't diagnose based on one test).

Speech perception is key → don't rely only on thresholds.

*Management = **complex**:*

- *Mild cases → HA + speech therapy.*
- *Severe speech perception issue → CI (early).*

*Warn parents: Progress is **unpredictable** (some improve, some don't).*

Auditory Processing Disorder (APD)

***APD** = difficulty in processing auditory information in the brain despite **normal peripheral hearing**.*

- *Common in school-age children with complaints of **difficulty understanding speech in noise, following directions, or reading problems**.*
- *Peripheral hearing (PTA, OAEs, ABR) = typically normal.*
- ***Symptoms:***
 - *“I can hear but I don’t understand.”*
 - *Trouble in noisy environments.*
 - *Poor auditory memory, attention.*
- ***Diagnosis requires:***
 - *Normal audiogram.*
 - *Battery of central auditory tests (e.g., Dichotic Listening, Gap Detection, Frequency Pattern).*
 - *SCAN-C/SCAN-A, or other standardized APD test batteries.*

***Auditory Processing Disorder (APD)
Assessment Report***

File NO: _____

Date: _____

Name: ***Sex:*** ***Age:***

Peripheral Hearing:

PTA: ☐ *Normal* ☐ *Abnormal*

OAEs: ☐ *Present*

ABR: ☐ *Normal*

APD Test Battery:

☐ *Dichotic Digits:* _____ %

☐ *Gaps-in-Noise:* _____ ms

☐ *Frequency Pattern:* _____ %

☐ *Other:* _____

Interpretation:

☐ *APD confirmed*

☐ *APD suspected – needs further evaluation*

Management Plan:

☐ *Auditory training*

☐ *Environmental modifications*

☐ *FM system*

☐ *Compensatory strategies*

Comments: _____

Example Report

Result:

- *PTA: Normal hearing thresholds bilaterally.*
- *OAEs: Present.*
- *ABR: Normal.*
- *APD tests:*
 - *Dichotic digits = 60% (poor).*
 - *Gaps-in-Noise = 8 ms (abnormal).*

Interpretation: *Consistent with APD.*

Plan: *Recommend auditory training (computer-based), classroom FM system, preferential seating, and teacher support.*

Counseling & Report Writing Essentials

*Good counseling and clear reporting = **better compliance, less confusion, and professional credibility.***

*Audiology reports are **communication tools** for:*

- *ENT physicians*
- *Patients & families*
- *Insurance / legal authorities*

Principles of Good Audiology Reports

Concise & structured (avoid unnecessary jargon).

Objective first, interpretation second (e.g., results → meaning → plan).

Patient-friendly summary when needed.

Actionable recommendations (what's next?).

Report Structure

1. Header: Patient details (Name, Age, Date, ID).

2. Reason for referral: e.g., hearing difficulty, tinnitus, vertigo.

3. Test results: Organized table/chart.

4. Interpretation: Plain language + clinical meaning.

5. Recommendations: Next steps (medical, audiological, rehab).

Counseling Essentials

Before testing: *Explain purpose (reduce anxiety).*

- **After testing:** *Use simple terms (“inner ear” instead of “cochlea” if family is non-medical).*
- **Set realistic expectations:** *Especially for CI, tinnitus, VRT.*
- **Use visual aids:** *Audiograms, diagrams, demo devices.*

Counseling Tips for Different Scenarios:

- **Parents of a child with HL:** *Focus on **early intervention**, avoid blame.*
- **Tinnitus patients:** *“We can manage it” vs “We will cure it” → realistic approach.*
- **Vestibular disorders:** *Explain recovery timeline & importance of exercises.*

Medico-Legal Audiology Reports

Medico-legal reports = *formal audiology documents* used for:

- *Disability evaluation* (hearing impairment %).
- *Compensation claims* (work-related HL, noise-induced HL).
- *Military / driving / employment fitness*.
- *Court cases* (trauma, malpractice, insurance).

These reports must be *objective, standardized, and legally defensible*.

Key Components

Patient identity & demographics.

Reason for report (e.g., disability claim, fitness for duty).

Tests performed (PTA, Speech, Tymp, ABR if needed).

Result interpretation in standard terms (bilateral severe SNHL, etc.).

Percentage of hearing disability → use recognized formula (e.g., **AAO-HNS**, **WHO** guidelines).

Declaration & signature (with stamp, date).

Example Report

Purpose: Disability evaluation for compensation.

Result:

- PTA (better ear) = 70 dB HL → severe SNHL.
- PTA (worse ear) = 90 dB HL → profound SNHL.

Disability:

- Right = 68%

- *Left* = 80%
- *Combined* = 74% (WHO formula).

Interpretation: *Permanent bilateral severe-profound SNHL with significant communication handicap.*

Tips

Follow **national guidelines** for disability calculation.

Keep language formal & factual (avoid subjective comments).

Attach **audiogram** as evidence.

Sign, date, and stamp the report.

International Ethical Guidelines

- **ASHA Code of Ethics**
- **AAA (American Academy of Audiology) Ethical Practices**
- **BSA (British Society of Audiology)**

Documentation & Legal Protection for Audiologists

In audiology, **accurate documentation = legal protection** + continuity of care + professional credibility.

- If something goes wrong, your report is your **first line of defense**.
- “If it’s not documented, it didn’t happen.”

What to Document in Every Case

Patient identification: Full name, DOB, ID number.

Reason for referral: Why the test was done.

Clinical history: Relevant symptoms, risk factors.

Test details:

- Test name, date, equipment model, calibration status.
- Stimulus parameters (ABR, OAE, ASSR, etc.).

Results: Numerical data + audiogram if applicable.

Interpretation: In clinical context (not just raw data).

Plan / Recommendations: Next steps clearly stated.

Informed consent: Especially for invasive tests, hearing aids, CI.

Legal Red Flags to Avoid

- Sharing results without **patient consent** (except when legally required).

Tips & Pitfalls in Report Writing

Tips

- Read all results before writing — think of the **patient's full story**.
- Always mention **test reliability** (cooperation, sedation, masking).
- Use **clear, simple language**; avoid unnecessary jargon.
- Follow a **logical sequence**:
History → **Examination** → **Results** → **Interpretation** → **Diagnosis** → **Recommendations**.
- Put **practical recommendations first**; answer: “So what’s next?”

Pitfalls

- Copying numbers without explanation → confusing.
- Vague diagnosis like “hearing loss” → always specify **ear, type, degree**.
- Skipping recommendations or being too vague.
- Forgetting to document **test conditions** (cooperation, sedation, masking).

Common Errors Students Make

- Writing diagnosis **without enough details** (ear, type, degree).
- **Failing to cross-check**: PTA ↔ SRT ↔ OAE ↔ ABR.
- Using **non-standard or unclear terminology**.
- Ignoring **functional impact**: speech, school, daily life.
- **Not documenting reliability issues** or test problems.

Evidence-Based Recommendations

Follow **international guidelines** (AAA 2012, ASHA 2004).

Key Recommendations

- **ENT referral** → specify reason, e.g., “ENT referral to evaluate middle ear effusion.”

- **Hearing aid trial** → include type, ear, and real-ear verification.
- **Speech-language therapy** → include goals, age, or language level.
- **Follow-up schedule** → 3 months, 6 months, yearly, etc.
- **Parent/therapist notes** → simple language, practical daily tips, expectations.

Example (Strong Report)

Diagnosis: Bilateral moderate sloping sensorineural hearing loss.

Recommendations:

- ENT referral to rule out middle ear pathology.
- Binaural digital hearing aids with real-ear verification.
- Speech-language therapy focusing on receptive language skills.
- Follow-up in 6 months for aided thresholds and speech progress.

Final Words – Becoming a Report Writing Pro

- The report is the *heart of clinical communication* between you, the medical team, and the family
- Every page you write should *reflect clinical reasoning and evidence-based analysis*.
- The *audiology report is your voice* in patient care.

“Strength lies in simplicity and accuracy; value lies in clarity and actionable recommendations.”

- *Over time, you won’t just write reports — you’ll impact patient care.*

Conclusion

Dear Reader,

Congratulations! You have reached the end of The Art of Evidence-Based Best Practices in Audiology Report Writing.

*Writing a professional audiology report is more than documenting test results—it is **a bridge between clinical assessment and patient care**. A clear, accurate, and evidence-based report empowers ENT doctors, speech-language pathologists, parents, and, most importantly, the patient.*

Remember:

- *Clarity matters more than complexity.*
- *Evidence matters more than opinion.*
- *Actionable recommendations matter more than data alone.*

*By practicing the principles, templates, and tips in this book, you are not just improving your report writing—you are improving **patient outcomes** and becoming a confident, thoughtful audiologist.*

*May this book be your **companion, guide, and reference** throughout your audiology career.*

*I hope this book serves as a practical, easy-to-follow resource for **audiology interns, fresh graduates, and early-career clinicians**, helping them master **the art of evidence-based report writing**.*

With warm regards,

Dr. Hany Abdou,

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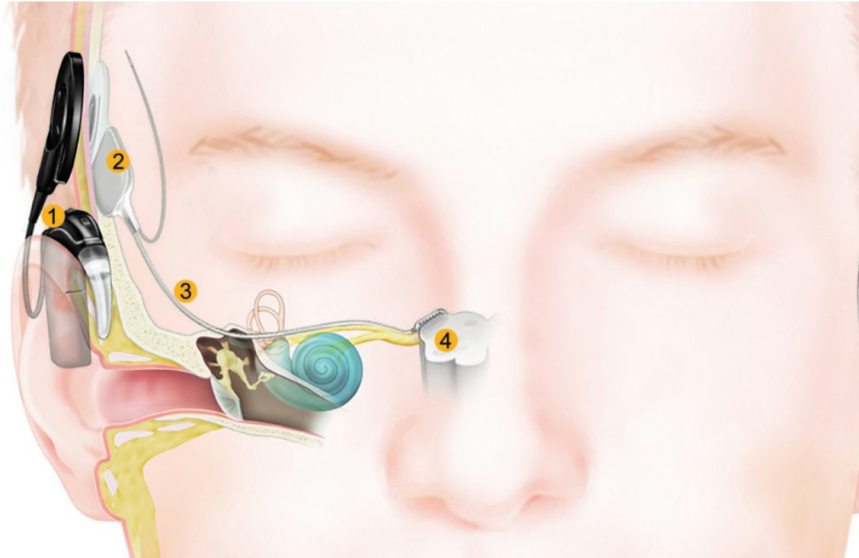
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The Art of Evidence-Based Best Practices in Audiology Report Writing



The Ultimate Evidence-Based practical Guide for Audiology Intern & Fresh Graduates

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- Why Evidence-Based Reporting is
a Game-Changer

* Evidence-based reporting is not
optional—it's the language of
clarity.

My book shows you how to write
reports that are accurate,
professional, and trusted.

* Stop reinventing the wheel. Start
using smart templates

